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ABSTRACT

A resource teacher working at an elementary school located on a military reservation implemented an 8-week practicum intervention designed to improve the critical thinking skills of 16 third graders. A task force composed of resource and classroom teachers, a guidance counselor, a reading curriculum supervisor, a school psychologist, a principal, and the director of the program for exceptional children produced a two-tiered Acceleration and/or Enrichment Program designed to challenge gifted and talented students. Students participating in a unit of study on Aviation and the Future of Space Exploration were provided access to a resource room providing curriculum enrichment, individual instruction, emphasis on the higher mental processes of divergent thinking and creativity, independent study, problem-solving projects with real products, and alternative techniques that offered a change from the routine of the regular classroom. Evaluation data showed that students made progress in each of the thinking skills addressed: comprehension, application, analysis, synthesis, and evaluation. A total of 47 references are cited. Appendices include a program brochure, the unit outline, classroom materials, and activities for building thinking skills. (RH)

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TO ENCOURAGE DEVELOPMENT OF THE CRITICAL THINKING SKILLS FOR THIRD GRADE ELEMENTARY STUDENTS

By

Noel V. Harris

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A Practicum Report
submitted to the Faculty of the Center for the Advancement of Education of Nova University in partial fulfullment of the requirements for the degree of Master of Science.

July, 1985

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I hereby testify that this paper and the work it reports are entirely my own. Where it has been necessary to draw from the work of others, published or unpublished, I have acknowledged such work in accordance with accepted scholarly and editorial practice. I give this testimony freely, out of respect for the scholarship of other workers in the field and in the hope that my own work, presented here, will earn similar respect.

Noel V. Harris

Noel V. Harris

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ABSTRACT

A model program to improve the critical thinking skills for third grade elementary students. Harris, Noel V. 1985: Practicum Report, Nova University, Center for the Advancement of Education. Descriptors: Critical Thinking/Cognitive Processes/Thinking Processes/Thought Processes/Learning Plateaus/Thinking Skills Development/Mastery Learning/Ability Identification/Teaching Skills/Teaching Methods/Teacher Effectiveness/Primary Education--Grade 3/Self Concept.

A team led by the author developed and implemented a model program to aid the academically Gifted/Talented students in a military community with multi-cultural backgrounds. The "Acceleration and/or Enrichment Program" (Ac/E) was designed to challenge the student through varied learning methods. Ultimately, Ac/E will develop within the student a desire for excellence and responsibility to his community and a changing society. The program's aims were to help the Academically Gifted/Talented students, who have unique learning and social needs, develop their potential and abilities through a differentiated educational services beyond those provided by the regular school program. The author's specific goal was to improve the critical thinking skills of a small group of third grade students in one of the six resource room elementary schools in the military community. The program included a systematic approach to

learning through the use of units of study centering around students' interests. After screening and administering Renzulli's Interest-A-Lyzer Inventories, students were sent to resource rooms for special instructions using Bloom's model for Higher Levels of Thinking. Students, parents, and teachers, surveyed at the conclusion of the program commented favorably as to the improved achievement and cognitive performance and affective behavior. Continued development of units of study for elementary schools were encouraged by the District School Superintendent and School opening in 1985 in order to complete the District-wide goal of improved instruction for the military community's students.

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PURPOSE

Gifted and Talented students respond to a particular learning environment which develops their differential abilities and varying levels of talents. They have special educational needs and this author has concerned himself with developing a program and atmosphere to enhance each student's potential. The Gifted and Talented teacher's most important function is to provide the most meaningful, relevant learning encounters which include (1) those learning activities that are the appropriate level and pace, (2) those that develop convergent and imaginative abilities, (3) those that develop self awareness and acceptance of their own capacities and interests, (4) those that stimulate reading, self-direction, and discipline, (5) those that stimulate higher goals and aspirations, and (6) those that lead to exposure of a variety of fields of study, art, professions, and occupations. Obviously, all the needs of the Gifted and Talented students cannot be met in a single program offering. However, far more information (enrichment) can be provided than the regular classroom offers. Students can be given much freedom to learn through experiences of exploration. Instruction can be guided to higher level ideas and content. Special services can be offered through pull out programs which provide instruction on special topics in elementary school resource rooms.

The problem being addressed in this paper takes place in an elementary school located on a military reservation in the southeastern portion of the United States. This school is one of six elementary schools on the post and is attended by children whose parent(s) are both enlisted and commissioned officers in the military.

Most nationalities are represented in the student body. The economic status of the majority of parents is described as lower/middle or middle class. All the families live on post in government housing and have the advantage of post exchanges and commissary privileges where they have benefit of reduced prices for life's essentials.

Further description of the typical military family involved here would include the fact that the educational level of the parents covers the spectrum of high school drop-out to parents with advanced college degrees. Numerous cases have both parents employed outside the home; and in some cases, one or both parents are enrolled in a school for further education.

The Administration has indicated that in approximately seven percent of the cases, communications between teachers, parents, and students are less than desirable because of a language barrier.

Members of the military are transferred to other installations at varying times, usually being relocated

every two to five years. The military parent also travels to other locations for short lengths of time periodically--for example, training exercises and/or peace keeping efforts in various "hot spots" around the world. It would appear that in many families absences of any duration of either parent has its adverse effects, particularly upon the child.

Total school enrollment for this elementary school is four hundred and seventy two (472) with teacher/pupil ration per classroom of one-to-nineteen. The students have many opportunities to receive individual instruction because classroom teachers can have special groupings according to ability within each grade level, part-time availability to an instructional assistant in each classroom, a Guidance Counselor, a reading specialist, a teacher and a strong parent volunteer group. Even though students have multiple advantages of services and personnel available to assist them, indications were that the development of thinking skills were less than desirable.

The first recognition of the problem occurred when the Post School Superintendent pointed out the need for improvement of instruction in the area of critical thinking skills. This challenged all Academically/Gifted resource teachers in the six elementary schools to the obvious problem that the students were not performing to their maximum potential. Classroom teachers were emphasizing

basic skills rather than skills in higher cognitive thinking. A task force selected to meet during the summer determined that a new approach to this problem should be implemented. Therefore, the resource teacher was assigned the entire responsibility to improve the critical thinking skills of those students identified as gifted and talented.

The nature and seriousness of the problem have been identified by the administering of the California Achievement Test, The Metropolitan Achievement Test, the Piers-Harris Self-Concept Scale and Meeker's Structure of the Intellect (Appendices D and I).

Substantial improvement in the critical thinking skills will be evidenced by improved student attitudes, selected motivational methods, and parental and classroom teacher involvement over an eight week period.

The task force organized during the summer of 1984 was given the responsibility for developing critical thinking skills of the system's students. The group focused on establishing a two-tiered program for students. The tiers would consist of one for talented services and one for gifted services. The objective is to improve the critical thinking skills on both levels. The dual tiered program was referred to as Acceleration/Enrichment (Ac/E). An information brochure is attached on page 33. The committee reflecting an ethnic population, was selected

by the Superintendent and was composed of eight resource teachers, one guidance counselor, four classroom teachers, a reading curriculum supervisor, a school psychologist, a principal and the director of the program for exceptional children. The committee was co-chaired by the author of this practicum paper.

The Superintendent sent a letter to all parents informing them of the objectives of the committee. A copy of this letter appears in Appendix B.

For the purpose of the practicum, the Ac/E resource teacher who is the author, will work with a group of sixteen third grade eight and nine year old students for four hours per week. The activities will include a unit of study based upon Bloom's taxonomy of higher learning. The writer has developed a learning center unit based on Aviation and Space exploration of the future and has developed a pre and post test which can be identified as Appendix C. These test scores will be recorded and analyzed by the writer.

Achievement scores will also be recorded to show progress made (see Appendix D). Teacher, student, and parent evaluations will also be administered and included in the evaluation of attitudinal and affective behavior (see Apendices F, G and H).

The writer has previously (August 30 and September 4 and 5) informed parents of the new program and objectives programmed for the year 1984-85.

A systematic approach to learning, through the use of units of study centering around students' interest, helps in improvement of the student's understanding of himself and the world around him. The author's objectives include:

A. Over a period of eight weeks the target population will improve its critical thinking skills as measured by Meeker's SOI Test Form A and B.

B. Over a period of eight weeks the target population will show improvement in its achievement scores as measured by the chart on page 47, Appendix D.

C. The target population will improve self-concepts. A student attitude survey of the Ac/E Committee (which appears on page 53, Appendix H) will be used as pre and post implementation.

D. The target population will show improvement in the development of leadership skills by participating in small group activities. It will be measured by the student checklist from Clendening, Challenging the Gifted, Appendix E. A pre and post test will be utilized.

E. Parent and teacher attitudes will be evaluated with a pre and post attitude survey (pages 51, 52, Appendices F and G).

RESEARCH

There is an emerging interest in reasoning skills and problem solving skills among the nations students. In a recent conference hosted by the Harvard Graduate School of Education, the key theme was that schools have failed to train students to be active questioners and to approach problems in a systematic and analytical way. Those at the conference desired a movement in education that promotes "critical thinking" as a basic skill along with reading and writing and arithmetic. Skills of thinking can be taught. It is particularly favorable with gifted children who are capable of self-management and decision making in blocks of independent time. It is especially advantageous for those in resource programs with times blocked out for studies in individual interest areas. These students have highly diverse interests and talents. Many function rapidly but also some are deliberate and contemplative. The trend can become one of using a systematic approach to the tasks. Teachers must begin teaching and testing in a logical way. According to a newspaper article (August 26, 1984), Fayetteville Observer Times, N.C.), in Prince Geroge's County, MD. Schools, teachers as a part of the curriculum revision, are encouraged to pose open-ended questions and multi-step problems. In Montgomery County, MD., elementary schools are using the popular commercially

prepared thinking skills program, "Instrumental Enrichment", where instruction focuses on fourteen thinking skills, including learning to use relevant information and organizing it. In this program, students complete exercises that require very little reading. Other popular thinking skills programs include:

_____ Structure of the Intellect, a program that breaks intelligence into one hundred twenty skills. Twenty-six of these are considered critical to academic success.

_____ Strategic Reasoning, an approach based on research done by Albert Upton, stresses five "thinking skills". These five skills include comparing and contrasting, classifying, synthesizing, drawing conclusions and understanding analogies.

_____ Lateral Thinking, a program that focuses on sixty very simple exercises, teaches creative thinking and creative problem solving. The exercises are intended to teach students not to reject ideas immediately since there are some aspects that are not immediately apparent.

In an article in September 1984, Educational Leadership, Richard Paul stresses that all teaching strategies need to be revamped especially in the areas of social studies and basic academic competencies. Also, the Cort Thinking Program,

developed by Edward de Bono of Cambridge University in England, discusses critical thinking, consisting of six units of ten lessons each. The units help students organize their thinking into arguments, "lateral" or creative thinking, to apply values and emotions effectively.

Some of these programs are more applicable to older high school and college students and will not be discussed in detail in this paper since the writer is dealing with elementary resource room students in the educational setting.

To help children develop their highest academic, intellectual, and moral potential, the educational system frequently fails to introduce critical thinking skills at an early age. The exceptional child, in a regular classroom, has to think in a conventional way. He will be punished for thinking in an individualistic way. Yet, thinking independently and critically is what the educational system should be promoting.

While all children go through the stages of cognition and moral development in an invariant sequence, the gifted child should have the capacity to reach higher stages earlier (Weinstein, Laufman, 1980). Thus a pull out program for Ac/E students would give the freedom and tools to help gifted/talented children think independently, critically, and analytically. To achieve this objective, we must provide the experience to develop reasoning skills. The students

should learn deductive and inductive reasoning in order to develop sensible conclusions. Through analysis, they should clarify concepts by examining their own language and consider the aesthetic dimensions of human experience.

After examining various thinking skills programs, the author has chosen Guilford's Structure of Intellect Theory (Meeker, 1978). Guilford's Theory is an acculturated model of intellectual aptitudes or intelligence which seems to encompass most of those abilities defining testable performances of intellectual functioning.

Guilford thinks educators should identify those kinds of abilities students need for functioning intellectually, as well as, make an attempt to give students experiences which will help them develop those abilities. This approach to education would represent a different and promising goal for education. It would teach students how to learn, as well as, teach the studetn the content of the subject matter.

Mary Meeker states that the greatest utility of Guilford's model would not be in psychology but in education, in planning individual programs for children. Strengths and weaknesses in specific learning abilities could be identified and taught. In 1962, she attempted to base the Binet and WISC on a theory of intelligence for purposes of curriculum planning. She analyzed the items in these tests and assigned them to the Guilford factors. Meeker developed templates to translate test responses of Binets and WISCs to the SOI

model. The Binet and the WISC have limited diagnostic utility when reported as IQ scores and thus offer little guidance for prescriptive treatment. The Meeker model is a practical remedy for this situation. It allows teachers to pinpoint the mental processes in which a child needs help. The teacher can use the model to help a child learn by planning activities based on the three parts of the model: operation, contents, products. The individual SOI profile sheet is compiled on each child and from those sheets the method of curriculum planning formulated. Meeker provides many materials designed to strengthen a variety of thinking skills.

This concept devised by J.P. Guilford, adapted to educational purposes by Mary N. Meeker was implemented by a teacher, Eleanor Mannings. At a conference for parents and teachers of gifted children held at the University of the Pacific in Stockton, California, Mannings spoke of the SOI program. She remarked, "The goal of SOI is to get the children themselves involved in their learning" (Kester, 1982, p. 21). The author of this paper agrees with this philosphy and therefore chose Meeker's SOI program to show the student that he could improve deficits by using this diagnostic/prescriptive method. The author chose Meeker's SOI Form A for pre test and results were shared at an early 1984 fall conference with the students, parents, and teachers.

At that time the Ac/E resource teacher, who is the author of this paper, had eleven identified students in the program.

The gifted have gaps according to Dr. Meeker (Meeker, 1972). The problems can arise from cognitive deficits such as poor memory, inability to see relations, or poor visual or auditory discrimination. The perscriptive approach-remediation of deficits within these categories--can be utilized to strengthen the weaknesses simply by changing the tasks or methods not the subject matter. The concept is usable with all children and adults.

The Ac/E Third Grade Meeker's Survey (Appendix I) shows deficit areas in cognition of figural systems (CFS), cognition of figural transformations (CFT), evaluation of symbolic transformation (ESC), and convergent symbolic implications (NSI). Activities in these deficit areas were duplicated from Meeker's source books. Many of the worksheets were laminated and used for independent work in the resource room. Some students had the option of taking mimeographed packets home to work as homework. All students were required to have the resource teacher correct and evaluate progress made.

Evidence found in a study (Pearce, 1983) concluded that the four SOI abilities of cognition of semantic units (CMU), cognition of semanic systems (CMS), convergent production of symbolic transformation (NST), and convergent

production of symbolic implications (NSI) for subjects in the study were found to be independently related to the ability to reason by analogy. The study was another reason this author chose to use SOI analogies activities and other commercial analogy activities.

Meeker's program not only improves cognitive growth but also includes tasks that expand children's divergent and creative skills. Because of the many bilingual and culturally handicapped children in the program (see Appendix D, the author's investigation of SOI Reserach Studies (Appendix K) led him to include the Divergent Production Source books activities adaptations to the Aviation Unit.

The author of this paper has chosen Bloom's taxonomy of higher levels of thinking as part of the solution strategy in implementing the program. Bloom states that the teacher should have a perspective on what behaviors that in turn can be evaluated if clearly defined. These models help in writing group educational plans as well as individual educational plans for those exceptional students who have learning disabilities, cultural deprivation and underachievement.

Programs for the gifted are often accused of lacking form continuity or consistency within the school district. Programs have also been accused of teaching the same kinds of activities that the classroom teacher teaches and often simply includes more of rather than different tasks. By

planning around a model, the resource teacher is able to organize the activities into meaningful results. Developing units around models would help the teacher of the gifted/talented effectively communicate with the classroom teacher, administration, parents, and the students. It all needs to come together and curriculum based on a model appears to facilitate this idea.

Many of the students in this study require individualized instruction. Individualized learning comes about by varying the teaching and learning processes according to interests, preferences, sociometrics, learning styles, and abilities and achievements of the students. Individualized does not mean that the author instructs every child individually nor does it mean that group instruction is obsolete. Grouping students for academic and social learning is a necessary component of an individualized classroom. Learning to interact, cooperate, and work as a group member is vital to the development of each child. Students should be members of various groups in order to have various experiences. Although not accountable for teaching all the students the same body of knowledge and skills, the teacher should direct the student's learning in relationship to his learning style and needs. The major emphasis in evaluating students is for processes of learning, not on the products of learning. Learning centers based on units

of student's interests help organize and direct learning experiences for students by allowing freedom while providing structure and accountability.

Not only is the student's learning style important for the improvement of achievement of the gifted child but he must have enriched accelerated curriculum. The student must develop the importance of task committment. In the article of Gifted Child Quarterly, Schooling for the Gifted: Where Do We Go From Here?, Catherine B. Bruch quotes John Gardner thesis in Nation at Risk as, "We can provide aid, however, through helping the student to raise his sights, to recognize his abilities and to develop meaningful goals and values leading to purposeful fulfillment. We cannot predict what skills will be needed in the future, we must train our ablest young people in both the fundamental fields of knowledge and the capacity to comprehend and cope with change".

Also involved in the improvement of achievement is the importance of providing learning activities at an appropriate level and pace. Research has shown that it is not harmful to the social and emotional development of gifted children. Some experts say acceleration is more effective in the earlier grades. In the subjects of math and science vertical acceleration is appropriate if done sequencially. History and literature are most suited to

horizontal enrichment. According to the reflections of the article "Gifted at Risk in a Place Called School" (Feldhusen and Hoover, 1984) the gifted exhibit new and more adequate adjustment when they are grouped with challenging and stimulating peers. They have a strong interest in being independent workers and a real desire to complete independent studies. The task cards in the units of study based on Bloom's taxonomy helped in giving some concrete direction in independent studies. The worksheets in each individual student packet also provided an accountability feature.

The gifted student's strong need to develop self-direction and independence can be achieved by providing books for reading in order to stimulate and gain access to more information and ideas. Through reading many and various books other needs are satisfied. By sharing the newly found information either in the form of reports, interviews, graphics, or demonstrations, students may stimulate one another and provide reinforcement of their self-concepts. All individuals need to believe that they are worthwhile and important. Reality Therapy (RT) is a concept of Glassers that indicates teaching success for gifted is used (Borgers 1980). The method includes seven principles. The first principle is involvement. Involvement of the students and teacher is a basic need and a prerequisite

for a success identity. Also focusing on present behavior occuring in a child's life and evaluating that behavior in a positive manner by the teacher. A good teacher can have effective communication with a student by being a good listener and giving feedback so that the student can assume responsibility for it and possibly make behavior changes. A good teacher must project a sense of hope. The teacher must plan with the student to produce positive behaviors (either verbally written or spoken) so that he may utilize his talent to the benefit of all. It is also important for him to make a committment in order to gain a sense of self worth and maturity. The sixth principle of Reality Therapy is accepting no excuses. Such a committment encourages the gifted to become more responsible. In Reality Therapy the last principle is of eliminating punishment. All of these principles offer the classroom teacher and resource teachers a workable strategy for providing for increased involvement and reasonable behaviors of students.

Improving self concepts is an important objective of the writer of this paper. The Piers-Harris Concept Scale pre test indicated that students of the target population had a concern for popularity among students, leadership skills, fear of failure, pace of studies and self esteem. The high percentage of Ac/E students answering negatively

on the chart (Appendix L, Page 57) indicates a need for interventions. It is the opinion of the author of this paper that preventative mental health measures, which nourishes the affective needs of gifted children should be used. Because guidance counselors lack the time to effectively meet the needs of gifted, another source should be found. According to the DGG Model for Differential Guidance for the Gifted (Safter and Bruch, 1984), the teacher can deal with problems by focusing on processes. To use this model the teacher should identify the categories of giftedness of the individual child, socioeconomic status of the family and its value orientation, along with the developmental level expressed as grade level. The process should be ongoing and not dependent upon crises. The curriculum should be:

1. Flexible and individualized
2. Based on higher level thought process
3. Creative in approach and orientation
4. Allow for acceleration, grouping and enrichment
5. Allow for acceptance of individual differences in style of learning
6. Allow more homogeneous superior classes
7. Provide life skills training
8. Provide "time-out-of-school"
9. Provide mentors

10. Provide for use of community resources
11. Is future-focused in presentation of curricular materials
12. Is proactive and developmental

The author of this paper included activities to improve leadership skills by using small group activities from Values Clarification Activities (Simon, Howe, and Kirschenbaum). Involving students in practical experiences, making them aware of their own feelings, ideas and beliefs so that choices and decisions would be based on their own value systems.

The last objective of the writer was to encourage student, teacher, parent involvement into the curriculum development which would lead to improvement of evaluations of the Ac/E program. Progress reports for each exceptional child have always been accomplished through on-going parent conferencing and consultation with teachers.

To each gifted and talented individual, the most valuable form of evaluative feedback comes through self evaluation facilitated by the Ac/E resource teacher. According to Renzulli, "When it comes to assessing work that clearly represents departures above and beyond the required curriculum, I believe that we should abandon the use of formal grades and replace them with procedures that guarantee students comprehensive evaluative feedback" (p. 18,

Gifted Children Newsletter, September 1983, Vol. 4, No. 9). How well the student does in the activities that the student and teacher agree are important, what the subject did to the student, and how he compared to his own goals and objectives. Self evaluation is a necessary skill for all gifted and talented children to acquire and this writer recommends that it be a major part of the evaluation procedure at the elementary level of the Ac/E program. This kind of self evaluative feedback, with periodic progress reporting (in oral and written form) can be beneficial.

Two main concerns for gifted programs have been scheduling times for resource and involvement of regular classroom teachers in designing a program curricula for "time out" of regular classrooms. Teachers are reluctant to let the students leave their classrooms on a regualr basis and go to other activities. Yet many of the gifted advocates express that "much of the thrust of the best curriculum development (for gifted and talented) involves breaking down the classroom walls and opening up the child to a variety of educational experiences not necessarily inside the school grounds" (Gowan, 1971).

METHOD

The author of this paper stated earlier that the results of the Meeker's SOI pre test showed needed improvement in the area of critical thinking skills, especially in the area of analytical problem solving. Improvement was needed in cognitive and divergent production of intellectual abilities. Achievement scores of the Metropolitan Achievement Test (10/84) indicated that only one student of the target population scored above the 90 percent in reading and two students scored above the 90 percent in math. This indicated achievement scores need improvement. After working on critical thinking skills and using the unit approach with Bloom's taxonomy in the resource room, the students were then tested on the same instrument two months later. Thirteen of the sixteen students improved in the reading area and twelve students improved in the math area. On 12/84 ten students of the sixteen students tested scored below the 90 percent in reading and six students scored below the 90 percent in math. This indicated continued improvement needed. The spring of 1984 California Achievement scores indicated one hearing impaired student, three bilingual, and one underachieving student, for a total of five students out of the target population (31%) scored below the 90 percent in reading and one bilingual student scored

below 90 percent in math. Two bilingual students scored below 90 percent on the total test. All other students scored above the 90 percent.

The Piers-Harris Self Concept Scale indicated five out of sixteen students needed improvement in self concepts and self esteem.

After reviewing the research the writer chose to concern himself with improvement in critical thinking skills, achievement scores, self-concepts, leadership involvement, self evaluations in order to allow the gifted and talented student to develop his highest academic, intellectual and moral potential.

Implementation in the first week included an overview of the Aviation unit and implications of future space explorations. Student activity packets were distributed among the sixteen highly motivated students. The topic was particularly interesting to the students because of their parent(s) career occupations. Many have expectations of becoming astronauts. The Student Activity Packet explains the procedure and includes activities according to Bloom. The activities to be monitored by the resource teacher were to be dated as to the day completed (See Appendix C, which contains the Aviation unit). The results of completion date provide an accountability feature for the student, teacher and parent as to the pace of the student. The Ac/E

resource teacher administered a teacher design test on aviation. The results are shown on the charts (Appendices M and N). Additional activities were cut out and placed on high interest flying machines tagboard cutouts to meet the needs of those students who worked at a rapid speed. These Bloom related activities were placed on three sectioned bulletin board designed by a parent volunteer and used as a learning center in the resource room. The unit was designed for future use in the media center for other interested students who have that particular interest and are not involved in a special resource program.

In the second week of study, the students will continue to work on independent research sheets. They will work in "Buddy Pairs" to complete the Classifying and Figure Families Sheets which were laminated. The teacher chose one hour to use Strategy Number 30 (page 219) entitled "Three Characters" to help the student become clearer about his own goals and purposes in life. By identifying with other people's aviator achievements and characteristics, the students were able to use their own values.

In the third week of study the student continued to work on the commercially printed thinking skills worksheets as well as Bloom's activities in the center. In coordination with the classroom teacher was studying weightlessness, the students watched a television series 321 Contact on Space Exploration.

The fourth week of study included Meeker's SOI sheets in the center. The students held interviews with each "Buddy Pair" pretending to be different aviators and taped their thoughts and feelings on the tape recorder. The students also gave several presentations where they role played as Wilbur and Orville Wright and the frustrations they encountered during their maiden adventures.

In the fifth week the students began to investigate satellites and the "Star Wars" program. They began to design their own satellite systems and converse about the expensive governmental program. Their interaction led to some noisy debates. The resource teacher interacted by using Strategy Number 32 in Values Clarification page 224 which posed some percentage questions of either or forced choice. This procedure gave the students a simple index of their feelings on various pairs of alternatives and gave them an opportunity to examine their priorities.

In the sixth week, the resource teacher contacted parents and support staff concerning the District Wide School Board meeting to be held during the month of May at which time the author of this paper was to present the Ac/E program progress for the year. All parents were informed by letter of the meeting and encouraged to attend. The writer of this paper presented the Aviation and Future Space Exploration unit to the board and parents, with favorable comments received from the Superintendent and the Director of Exceptional Children. (See Appendices O and P.

The last two weeks of implementation concluded with the completion of thinking skills activities within the unit as well as designing specific aircraft in the unit. A contest was held for students to hold aircraft test flights. Because of weather conditions certain dates were established for test flights. Test flight information sheets were passed out and contests were held. This was an ideal time for these contests as it was the last two weeks of school when weather was balmy and the children were getting excited about summer vacations. Winners received awards for Duration (seconds remaining in flight), Acrobatics and Altitude. The students were allowed to enter their own aircraft designs as well as those commercially designed ones presented by the resource teacher.

In the last week of implementation, all Student Activity Packets were evaluated by the students and the resource teacher. The post test was given and the results are included in this report in Appendix M. Improvements were shared with each student, teacher and parent. The evaluations were sent home with the report cards. The writer of this paper used the evaluation forms of Niskayuna School District which included Bloom's Thinking Skills checklist as well as a rating scale for time spent on interest unit (see Appendix Q). Ac/E surveys were sent home to parents and surveys were given to classroom teachers in order to get

their responses to the new Ac/E program. The responses were compiled by the Ac/E Director of Exceptional Children's Programs and results sent to parents and the Superintendent (see Appendix R).

The unit approach is advocated by this writer. It provides a cumulative learning effect rather than disconnected experiences. It gives opportunities for career education and allows interaction among students with similar abilities. It allows the district wide resource teachers to plan activities using a model and to do this advance (during summer months). District wide communication with classroom teachers and parents can be uniform. The unit package allows an accountability feature which gives better documentation as far as activities completed while in a resource four hours per week away from regular classrooms. It enhances better communication between student and resource teacher, resource teacher to classroom teacher and resource teacher to parent. It allows showing progress in thinking skills, leadership development, behavioral attitudes and affective relationships of self and peer group with differing abilities. It gives choices as far as learning styles (tape, write or role play), and allows time for completion of creative talents.

RESULTS

Resource room services expands the gifted child's learning by enriching different curriculum materials, individual instruction, emphasis on the higher mental processes of divergent thinking and creativity, independent study, problem-solving projects with real products, and any number of techniques that give them a change from the routine of the regular classroom. The resource teacher, who is the author of this paper, chose Meeker's SOI Form B, Piers-Harris, and Clendening's checklist (Appendices D and E) to give to the target population at the end of the eight week period in order to determine progress made during the year.

The author of this paper chose Mary Meeker's SOI test because an evaluation was needed as to the gaps in the gifted/talented learning aptitudes of the resource room student in the program. The manual states that problems stemming from cognitive deficits such as poor memory, inability to see relations, poor discrimination and learning or behavior problems must be found by making appropriate modification to the curricular. The SOI curriculum theory is the diagnosis and prescription. The way to accomplish success is by "differentiation". The relationship between learning abilities and self concept in children, ages eight to twelve, was reviewed by the author to see if there were

the same types of correlation. Learning abilities appeared to be clearly related to self concept particularly with regard to the operation which underlies school achievement: that is, convergent production. Some of Meeker's activities were used in the units of study and an end of the year evaluation made with the SOI Form B. Significant improvements were made in cognition of figural symbols and cognition of figural transformation (see Appendix J). Data shows that girls all over the country, average and gifted, have low CFS and CFT scores. There may be many reasons for this, but since these two abilities underlie the advanced math skills, it is critical to bring these two areas up to grade level.

In the Aviation unit of study, progress was made in each of the thinking skills as shown in the chart (Appendix M). Two of the students moved from the district to another location and all but two students improved on the total scores of the unit post test. Improvement in each of the critical thinking skills is shown graphically in Appendix N. Ten students improved significantly on Comprehension, five improved on Application, four improved on Analysis, six improved on Synthesis, three improved on Evaluation Skills. In summary, seventy-one percent of the target population improved in the unit's critical thinking skills areas.

According to the Piers-Harris manual, average scores are usually considered to be those between the thirty-first

percentile and seventieth percentiles or between a raw score of forty-six to sixty. Five Ac/E students or the target population scored below the thiry-first percentile. One student was an underachiever, three bilingual students and one hearing impaired student. The improvement is illustrated in Appendix D.

Another self appraisal was given to the Ac/E students in the spring 1985 to determine another area of concern to the resource teacher concerning behavior and self-esteem. It was a scale taken from Clendening's Challenging the Gifted, page 139. From the ten students who were in the resource program half of them expressed that they did accept what someone else says without challenging it. This leads the author to believe that students are made to think in a conventional way. However, the author also believes that it could be the parental training of the military family where the authority figure is never challenged. Half of the students say they do not enjoy abstract or mathematical problems and thus creative problem solving is not the fun activities they enjoy participating in. Again, on the scale, half the students stated that other people do not recognize that the student is an intelligent person. Results of the post test given to sixteen gifted students seven weeks later showed the three areas of disagreement were: 1) I feel strongly about things and often express my feelings even if I think others will disagree,

2) I often use music, art, or drama to express my feelings and 3) I don't like to accept what someone else says without challenging it (see Appendix E post test). The author cannot determine whether these concerns involve fear of failure, or thinking in a conventional way in order to gain approval. These two areas are major concerns of gifted children. Military children may have been disciplined to respect authority of adults by not challenging it. In a telephone discussion with Dr. Lolita Foster, (personal communication, June 12, 1985) educational consultant who has dealt with military dependents and done research on the military family structure in the surrounding community, has suggested that more research should be done in this area. Her suggestion was to use a group of gifted students along with a control group so that a more reliable comparison could be made. This she felt needed further study for future educational purposes.

Bloom's taxonomy provides the resource teacher a method of teacher-child interaction. It enables the child to learn to think independently and critically and the taxonomy becomes a valuable tool. Not only does it allow programming in the higher cognitive levels but it insures that all a activities will not be note learning or memorization at the knowledge level. The taxonomy gives the resource teacher a format to follow to teach children how to think,

to look at facts and information from a variety of perspectives. When the testing procedure and curricula are made available, then teachers are able to recognize giftedness and supplement the child's existing programs. Parents can become more involved as volunteers as the resource teacher can share long and short term goals for the students. The checklist and rating scales at the end of each study unit provide documentation to students, teachers, and parents as to specific objectives mastered. Thus the unit approach has an excellent evaluation procedure.

For resource room purposes and because of the transient population the taxonomy has been effective. There is an important point of the taxonomy and it is in listing the process skills. They are listed in a logical hierarchy but the appropriate use of thinking skills often proceeds in a cyclical rather than linear fashion (Renzulli, 1977). Therefore, it is not necessary to teach each skill in an orderly way. The important issue is that the students have exposure and can experience all the processes over a period of several years.

Results (see Appendix M) of the Aviation unit post test showed the total number of correct answers in each of the process skill areas of the target population. Two of the students moved to another location before their post test was administered. Improvement in each of the skill areas can be seen in the comparison chart in Appendix N.

The end of the year student, parent, teacher survey sheets showed ninety-three percent of the teachers agreed the Ac/E Program had helped them meet the needs of their special students. Eighty-nine percent of the teachers agreed they saw evidence of an improvement in their students ability to use critical thinking in soving problems (see Appendix R). On the parent survey, ninety-eight percent of the parents agreed that the Ac/E Program met the needs of his child and had increased the child's self confidence. One hundred percent thought the program should be continued (see Appendix R).

All Ac/E students polled by the resource teacher, who is the writer, agreed the time spent in the Ac/E resource room was just right or not enough (see Appendix S). The writer recorded the feelings of each of his students and those comments can be found in Appendix S.

RECOMMENDATIONS

The author has attempted to present a systematic approach to learning using Bloom's model with each unit of study that can be used in resource programs. The compiled results of students progress on the one unit, Aviation and the Future of Space Exploration, has been recorded in this report. Continuing and further development of the Ac/E Program can be seen in the 1985 Ac/E Committee Final Progress Report (Appendix O).

As a result of the practicum, the author has several recommendations:

1. More planning time and consultative time for meeting the needs of districts gifted and talented students could be established.

2. Resource programs could include enrichment activities and critical thinking skills as presented in the unit approach based on Bloom's taxonomy.

3. Continue communications with teaching and administration, including interpretation of gifted child programs and the identification process.

4. Media centers and professional libraries could become a store house for units designed around Bloom's taxonomy.

5. Resource teachers could hold in-service workshops or use staff meetings to share activities, games, and materials (including creative and critical thinking skills, independent study skills, and others).

6. Continue using surveys soliciting feedback from parents, students and school personnel.

7. Continue efforts to develop student self-evaluation skills.

8. Investigate and implement a mentor program.

Future studies need to consider the social development of the gifted child. Some of the more important questions to be addressed include:

1. Should we separate extremely high IQ children from other gifted and/or talented?

2. How much do peer values affect these gifted?

3. Do gifted girls tend to underachieve in order to gain acceptance with boys?

4. Is popularity of the gifted and talented achieved at the expense of accomplishments in the academic fields?

5. How much is their social acceptance or lack of it due to the particular values of the school system?

6. How are the gifted rated in other places (home, church, scouts, Little League) then the school setting?

7. Are the gifted popular because of special social skills?

8. Do gifted military children suffer because of their mobility? Or is this an advantage for them?

These questions and many more need to be answered.

The goal of the author will continue to be that the children's attitudes and self-concepts will improve,

children's leadership skills become apparent, parental involvement and expectations become realistic, and regular classroom teachers along with Ac/E resource room teachers, will feel involvement in this improvement.

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QUESTIONS FREQUENTLY ASKED BY PARENTS

Q. HOW DO STUDENTS ENTER THE Ac/E PROGRAM?

A. Identification process starts with a nomination from a teacher, parent, or student. Student data is collected and evaluated, and a placement recommendation is made by the School Base Committe.

Q. WHAT ABOUT THE WORK MY CHILD MISSES WHEN HE IS AWAY FROM HIS REGULAR CLASSROOM?

A. Your child's classroom and Ac/E teacher will work together with the student to coordinate skill building efforts. This does not mean that your youngster will be required to complete all activities missed while he attended resource class.

Q. HOW IS THE Ac/E PROGRAM IN THE RESOURCE SETTING DIFFERENT FROM THE REGULAR CLASSROOM?

A. Students of similar skill levels have the opportunity to work together to enhance thinking skills and content area knowledge with teachers who have specialized training in teaching this population of students.

Q. WILL MY (CHILD) BE ABLE TO GET THESE SERVICES AT OUR NEXT DUTY ASSIGNMENT?

A. Possibly, but not all states or DOD schools offer specialized services for this student population.

CONTACT PERSONNEL

PUPIL PERSONNEL SERVICES

Director of Pupil Personnel Services
Dr.

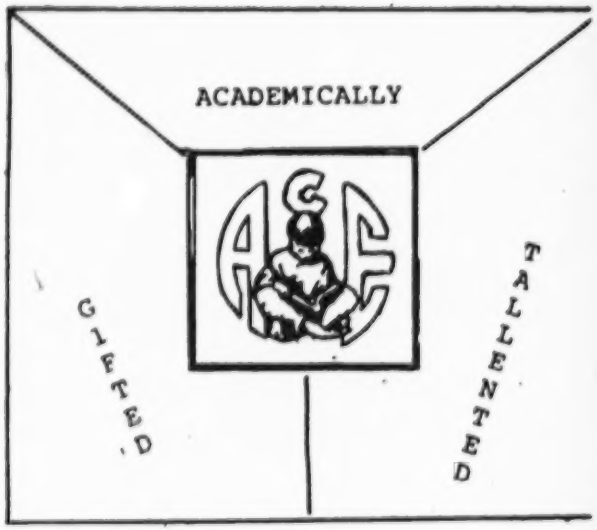
Supervisor, School Psychological Services
Mrs.

School	Ac/E Teacher	Phone

Appendix A
Ac/E Program Brochure

Ac/E

PROGRAM



SCHOOLS

PROGRAM FOR THE

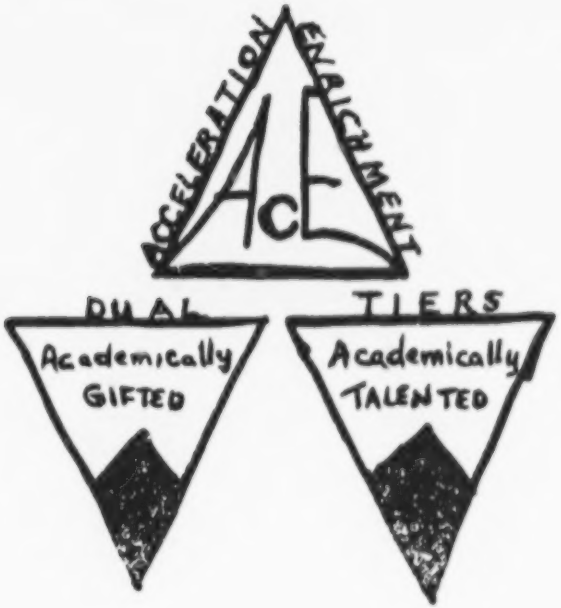
ACADEMICALLY

GIFTED AND TALENTED

PHILOSOPHY. . .

The School System is committed to providing a comprehensive educational program for the gifted and talented student population who have unique learning and social needs.

Ac/E - "Acceleration and/or Enrichment Program"-is designed to challenge the student through varied learning methods. Ultimately, Ac/E will develop within the student a desire for excellence and responsibility to his community and a changing society.



Academically gifted students are defined as those who demonstrate or have the potential to demonstrate outstanding intellectual aptitude and specific academic ability. In order to develop their abilities, these students may require differentiated educational services beyond those ordinarily provided by the regular school program.

Academically talented students demonstrate academic potential but do not qualify for services using the new selection criteria for academically gifted students.

Special Needs of the Gifted

* The need for security, self respect, and acceptance by others of himself rather than of any special gifts he may have.
* The need for challenging pursuits in which he can be successful.
* The need to be free of feelings of inferiority or superiority of peers but to be secure in his own intellectual abilities.
* The need to be free of failure and of the unrealistic expectations of others.
* The need for recognition, understanding, and acceptance of his giftedness by society.
* The need for multiple learning options.
* The need for encouragement and opportunity for leadership and creativity in addition to academic choices.
* The need to be aware of available career choices.
* The need for all kinds of adult supportive influences, from emotional help to academic mentors.

Appendix B

Letter from Superintendent

August 27, 1984

Superintendent of Schools

Re: Revisions of the Academically Gifted Program

Dear Parents:

During the past summer as part of an ongoing effort to improve services to the students of the Schools, a committee composed of teachers, guidance counselors, psychologists and administrators met to examine the services offered to Academically Gifted students.

As a result of the committee's work, services will be offered to both the gifted and talented students at during the 1984-85 school year. The dual tiered program has been renamed Acceleration and Enrichment (Ac/E) Program.

Parent information meetings will be scheduled in all schools early in the school year to acquaint parents with the changes in the Ac/E Program.

In addition, I have enclosed a pamphlet prepared by the committee that describes the program and lists individuals to contact for further information.

Both the Ac/E staff and I are confident that the new program will provide a range of services to better meet the needs of our students.

Sincerely,

Superintendent of Schools

:sfc

Enclosure

HISTORY-3rd GRADE AC/E STUDENTS

AVIATION UNIT
AMAZING FLYING MACHINES
AND OUR FUTURE

OPERATIONS:

Bloom's Taxonomy

Knowledge

Comprehension

Application

Analysis

Synthesis

Evaluation

OVERALL PURPOSE:

To present a general overview of Aviation and its past history, present day experiments, and explore its future potential for man.

OBJECTIVE:

To explore past flying machines, past and present experiments (successes and failures), and examine moral implications for new and future satellite programs.

BACKGROUND:

AC/E Gifted and Talented students using thinking skills in each unit of study will continue working individual and small group explorations. Opening activity will include tour of military air field.

MATERIALS:

Tagboard activity cards, student activity check list and packet, pencils, paper, tape recorder and tapes, poster board.

AC/E PROGRAM

CURRICULUM UNIT SKILL AREAS

GRADE 3

UNIT	RESEARCH SKILLS	CRITICAL THINKING SKILLS	CREATIVE THINKING SKILLS
AVIATION AND SPACE EXPLORATION OF THE FUTURE	1.USE OF ENCYCLOPEDIA TO GAIN INFORMATION. 2.USE OF NEWSPAPER OR NEWS MAGAZINE TO LOOK FOR BIASES OF AUTHOR. (ex.REAGON'S STAR WARS PROGRAM) 3.ORGANIZING OF INDEPENDENT RESEARCH. 4.USE OF MULTIPLE RESOURCES TO G THEIR INFO INDEPENDENTLY. 5.USE OF RESOURCES IN COMMUNITY TO GAIN INFO.	1.IDENTIFICATION OF MANY FACTS RELATED TO TOPIC. 2.ELABORATION OF IDEAS. 3.OBSERVE COMPARE ANALYZE CLASSIFY 4.DESIGNING OF ACTIVITIES TO UTILIZE INFORMATION AT EACH THINKING LEVEL:KNOWLEDGE, COMPREHENSION, APPLICATION, ANALYSIS, SYNTHESIS, EVALUATION.	1.SHARING INDEPENDENT RESEARCH THROUGH CREATION OF OWN PRODUCTS (SATELLITES, SPACE VEHICLES ETC) 2.CREATIVE PROBLEM SOLVING. 3.DESIGNING PLANES. a.ART b.WRITING c.ORAL d.GRAPHIC e.VISUAL

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FLYING

A New War Tests Wings

The Era of the Jet

The Story of Flight

The Age of the Universal Airlift

AVIATIC

THE FUTURE OF WING

STUDENT ACTIVITY CHECK LIST
ON
THE AMAZING FLYING MACHINE AND OUR FUTURE

PHASE I — DATE OF COMPLETION

1. I TOOK THE PRE TEST _____
2. I COMPLETED THE WORKSHEETS: _____

STORY OF FLIGHT _____

FLIGHTS THAT MADE HISTORY _____

AIRCRAFT THAT WORK FOR US _____

FANTASTIC PLANES _____

MODEL AIRPLANES AND HOW TO BUILD THEM _____

DIRIGIBLES _____

SPACE TRAVEL _____

STAR WARS AND IT'S IMPLICATIONS -- SATELLITE WARFARE _____

PHASE II

1. I COMPLETED CLASSIFYING SHEETS _____
2. I COMPLETED FIGURE FAMILIES SHEETS _____
3. I COMPLETED FIGURE ANALOGIES SHEETS _____
4. I COMPLETED FIGURE SIMILARITIES SHEETS _____
5. I COMPLETED VERBAL SIMILARITIES AND DIFFERENCES SHEETS _____
6. I COMPLETED VERBAL SEQUENCES SHEETS _____
7. I COMPLETED VERBAL CLASSIFICATIONS _____
8. I COMPLETED VERBAL ANALOGIES SHEETS _____

PHASE III.

1. I COMPLETED THE INVESTIGATION OF _____
2. I PRESENTED MY FINDINGS TO THE GROUP _____

PHASE IV.

1. I EVALUATED MYSELF ON EACH WORKSHEET _____
2. I TOOK THE POST TEST _____

NAME_____

AMAZING FLYING MACHINES AND OUR FUTURE

DATE_____

WHAT I WORKED ON_____

_____

_____

WHAT I FINISHED_____

_____

_____

MY EVALUATION OF MY PROGRESS SO FAR_____

_____

_____

COMMENTS_____

_____

_____

NAME_____

KEEPING TRACK OF AMAZING FLYING MACHINES AND OUR FUTURE

FOR THIS UNIT I WILL COMPLETE :

_____ACTIVITIES IN KNOWLEDGE/COMPREHENSION

_____ACTIVITIES IN SYNTHESIS

_____ACTIVITIES IN APPLICATION

_____ACTIVITIES IN EVALUATION

_____ACTIVITIES IN ANALYSIS

WHAT I HAVE COMPLETED

ACTIVITY #_____

DATE_____

ACTIVITY #_____

DATE _____

ACTIVITY #_____

DATE_____

ACTIVITY #_____

DATE _____

ACTIVITY #_____

DATE_____

ACTIVITY #_____

DATE_____

STORY OF FLIGHT

AN AVIATION ARTIST AND AUTHOR'S STATEMENT

"ARMED WITH THE ACCUMULATED KNOWLEDGE OF THE YEARS SINCE KITTY HAWK, THEY, THE PIONEERS, HASTEN MAN'S RACE WITH THE SUN AROUND THE RESTLESS EARTH."

CLAYTON KNIGHT

RECORD YOUR FEELINGS ABOUT THE TRUTH OF THIS STATEMENT HERE:

FLIGHTS THAT MADE HISTORY

LIST FLIGHTS THAT MADE HISTORY AND A STATEMENT AS TO WHY EACH WAS IMPORTANT.

OR

BELOW MAKE A TIME LINE OF IMPORTANT DATES IN AIRPLANE DEVELOPMENT.

ANALYSES
WORK SHEET #3

AIRCRAFT THAT WORK FOR US

LIST AND PUT INTO CATEGORIES FLYING MACHINES AND WINGLESS FLYING MACHINES AND THEIR USES.

FLYING MACHINES	WINGLESS FLYING MACHINES

COMPREHENSION
WORK SHEET #4

FANTASTIC PLANES

FOR THOUSANDS OF YEARS MAN DREAMED OF BEING ABLE TO FLY. IT WAS THOUGHT FROM EARLY TIMES THAT THE SECRET OF FLIGHT LAY IN BEING ABLE TO CONSTRUCT BIRD-LIKE WINGS, ATTACHING THEM TO THE ARMS OF A MAN WHO WOULD FLY BY MERELY FLAPPING THEM IN THE WIND. AN EARLY GREEK LEGEND TELLS HOW ICARUS AND DAEDALUS ATTEMPTED TO ESCAPE FOR THE ISLE OF CRETE BY FLYING WITH WINGS MADE OF BIRD FEATHERS STUCK TO THEIR ARMS BY WAX. IN 1500 AD LEONARDO DA VINCI, THE GREAT ITALIAN PAINTER AND SCULPTOR, DREW PLANS FOR FLYING MACHINES. AFTER YEARS OF FAILURE MAN ACTUALLY ROSE INTO THE AIR AND STAYED FOR A REASONABLE PERIOD OF TIME IN 1783 WHEN A BALLOON FILLED WITH HOT AIR WAS USED. FROM THIS FIRST ACHIEVEMENT, OVER 100 YEARS PASSED BEFORE THE FIRST POWERED AIRPLANE FLIGHT WAS MADE IN 1903 AT KITTY HAWK, N.C. BY ORVILLE AND WILBUR WRIGHT. THERE ARE NUMEROUS EXAMPLES OF "FIRSTS" THAT HAVE HELPED BLAZE THE TRAIL THAT HAS LED MAN INTO THE CONQUEST OF SPACE. LIST:

	WHO	WHAT	WHEN	WHERE
1st ATTEMPT TO IMITATE THE FLAPPING WINGS OF BIRDS IN FLIGHT				
FIRST POWERED FLIGHT				
FIRST PLANE TO ACHIEVE TRUE FLIGHT				
FIRST "HOP" FLIGHT IN BRITIAN				
FIRST TO HAVE WINGS LIKE A BAT				
FIRST TO MAKE A "CLAIMED" FLIGHT IN EUROPE				

	WHO	WHAT	WHEN	WHERE
FIRST TO ACHIEVE TRUE FLIGHT IN EUROPE				
FIRST SUCCESSFUL MONOPLANE				
FIRST FLIGHT ACROSS THE ENGLISH CHANNEL				
FIRST SEAPLANE TO FLY				
FIRST PASSENGER-CARRYING AIRCRAFT				
FIRST PROTOTYPE DESIGN FOR WORLD WAR I GERMAN FIGHTERS				
FIRST ROCKET-PROPELLED PLANE				
ONE OF THE LARGEST SEAPLANES EVER BUILT				
IT BROKE THE WORLD SPEED RECORD				
WORLD'S FIRST TWO-STAGE AIRCRAFT				
ONE OF THE MOST FAMOUS AIR RACERS				
ONE OF THE FIRST BUILD-IT-YOURSELF AIRCRAFTS				
TRANSPORTS THE AMERICAN MOON ROCKETS				
FIRST HELICOPTER TO FLY				
ONE OF THE LARGEST SKYCRANES				
IT WAS A PROTOTYPE OF TODAY'S VERTICAL TAKE-OFF AIRCRAFT				
ONE OF THE MOST ADVANCED FIGHTER PLANES				
IT IS A SUPERSONIC PASSENGER AIRCRAFT				

APPLICATION
WORK SHEET #5

MODEL AIRPLANES AND HOW TO
BUILD THEM

PRODUCT WORKPLAN

TITLE: _____

HOW I GO ABOUT ACCOMPLISHING THIS: _____

_____

_____

_____

_____

MATERIALS NEEDED:

_____

_____

_____

_____

APPLICATION
WORK SHEET #6

INVESTIGATION TOPIC: DIRIGIBLES

TIME TO ORGANIZE:

WRITE SOME QUESTIONS YOU WANT TO ANSWER BELOW:

_____

_____

_____

_____

NEW VOCABULARY:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

SYNTHESIS
WORK SHEET #7

INVESTIGATION TOPIC: SPACE TRAVEL

TIME TO ORGANIZE: DESIGNS IN FLYING MACHINES HAVE CHANGED THROUGH THE YEARS, FROM ELIMINATION OF WINGS AND PROPELLERS, ETC. TO ROCKETS AND SPACE PROJECTIONS, TO SATELLITES.

PRESENT SATELLITES ARE NOT VERY BIG. BUT THERE ARE SOME GIANT ONES ON THE DRAWING BOARD. ONE OF THESE IS A SOLAR ENERGY STATION. MANY SCIENTISTS THINK THAT SOMEDAY ALL THE ELECTRICITY NEEDED ON EARTH COULD BE SUPPLIED BY HUGE SOLAR POWER SATELLITES IN ORBIT AROUND THE EARTH. DESIGN YOUR OWN SATELLITE TO DO A JOB THAT YOU THINK IS IMPORTANT FOR US ON EARTH AND EXPLAIN WHY.

EVALUATION
WORK SHEET #8

STAR WARS AND ITS IMPLICATIONS

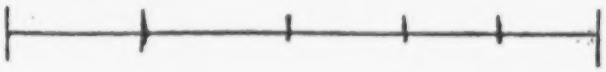
SATELLITE WARFARE

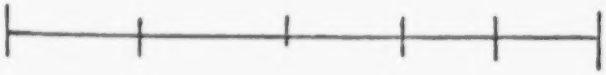
PRESIDENT REAGAN HAS ANNOUNCED HE WILL CONTINUE TO FUND AND INCREASE THE STAR WARS PROJECT BUDGET. TAKE A STAND AND EXPLAIN YOUR POSITION AS TO WHY YOU AGREE OF DISAGREE WITH HIS PROPOSAL.

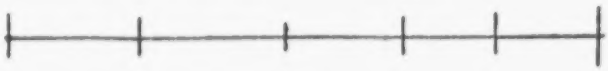
HOW DID YOU INVESTIGATE AND RESEARCH YOUR CONVICTIONS?

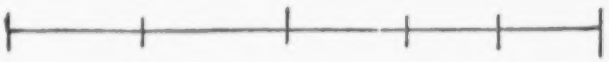
STUDENT SELF-EVALUATION

Student Evaluator: _____ Date: _____

1. Topic was very interesting  Topic was boring

2. I used many sources of information  I used only one source of information.

3. I used my time well  I wasted my time

4. I was an organized worker  I was an unorganized worker.

5. What did you learn from this investigation?

_____

_____

_____

_____

6. What problems did you encounter in your investigation?

_____

_____

_____

7. What could you have done to avoid those problems?

_____

_____

_____

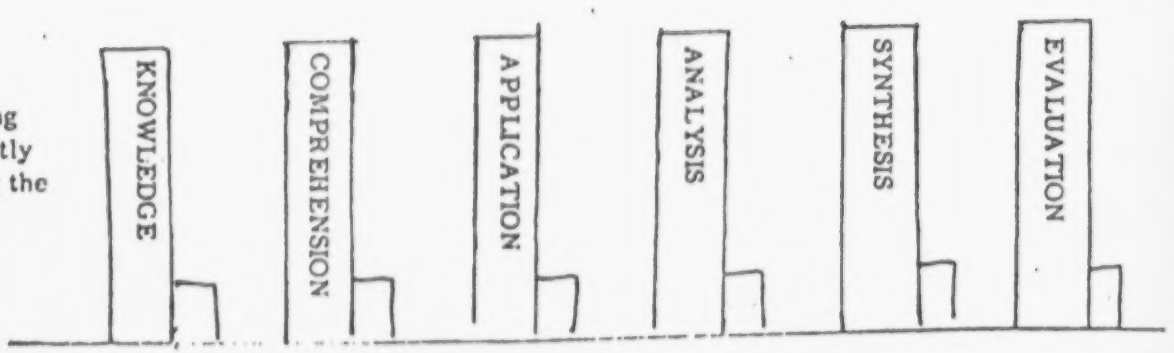
_____

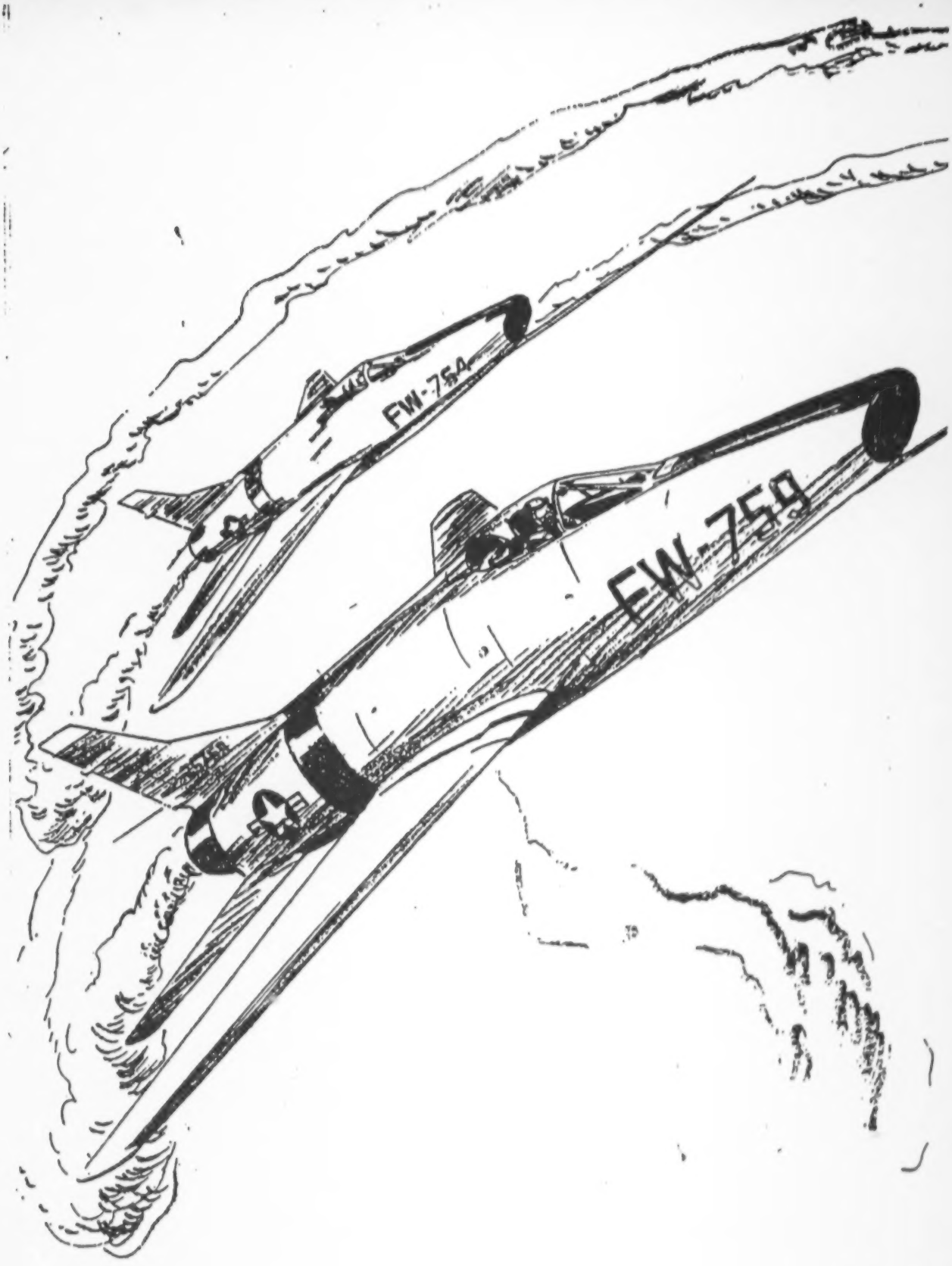
TEACHER EVALUATION

Teacher Evaluator: _____ Date: _____

1. Student was well organized	Student was poorly organized.
2. Student communicated ideas clearly	Student communicated ideas poorly
3. Student used time wisely	Student wasted time
4. Student used resources well	Student used resources poorly

Mark the thinking levels consistently observed during the investigation.




FW-754
FW-759

Print this surface

Print this surface

CATEGORIZE

Name_____

In each of the following lists a word is given with four possible answers following it.. Choose the best category to which each word belongs. Underline your selection.

1. dollar
   - currency
   - coin
   - token
   - paper money

2. oyster
   - fish
   - seafood
   - mollusk
   - food

3. galleon
   - vehicle
   - boat
   - war ship
   - vessel

4. bolero
   - garmet
   - oxford
   - hat
   - vest

5. leech
   - vegetable
   - mammal
   - animal
   - parasite

MATCHING Name_____

1. Underline the word on the right which best fits the word on the left.
2. More than one word might seem to fit but there is a best word.

1. violet
   - flower
   - plant
   - tree
   - nursery

2. steak
   - meat
   - entree
   - main dish
   - beef

3. coin
   - metal
   - disk
   - money
   - round object

4. hoe
   - a rake
   - a machine
   - garden tool
   - metal utensil

5. pear
   - produce
   - sweets
   - fruit
   - plant

6. hosiery
   - foot covering
   - garden necessity
   - stockings
   - leg covering

DIRECTIONS. UNDERNEATH ARE SOME WORDS. LOOK AT EACH ONE. IF IT HAS THE SAME LETTERS SOMEWHERE INSIDE OF THE BIG WORD, PUT AN X ON THE LINE. IF IT DOES NOT, MARK IT WITH A MINUS.

1. BUTTERFLY
   FLY TUB UP

2. GOLIATH
   GOLD ATE HAT

3. PORKY PIG
   ROB PIP GIB

4. QUICK DRAW
   QUIT RID RUIN

5. SESAME STREET
   SEES STREAM TREAT

6. MISTER ROGERS
   GIST TRIM GROW

7. POPEYE
   POPE YEA PIE

8. CAPTAIN
   NAP TACK AIN'T

9. KANGAROO
   NAG KNACK NOON

10. FLOWER
    ROW FLEW REAL WORK

11. PANSY
    NAP SAY SAND AYE

12. ROSES
    SOAR ROSS EROS STORE

13. VIOLET
    LET TELL VIOLIN VIE

14. CHURCHES
    CHORE HIS CHOICE HER

15. KANGAROO
    NAG MOAN GORE KOOL

16. HORSE
    SOW HER EASE SHORE

17. ELEPHANT

TEAL	PHONE	HEAT	ANT

18. JAGUAR

GUARD	RUG	ART	JAG

SELCT A CLASS NAME THAT MOST PRECISELY FITS A GROUP OF FOUR GIVEN WORDS

I CHUBBY, HEAVY, MUSCUAR, YOUTHFUL
- POSTURE
- BUILD
- SHAPE

II TELEGRAPH , TELEPHONE, RADIO, TELVISION
- SHAPE
- SPEED
- TIME

III CUP, PINCH OUNCE, TEASPOON,
- TABLESPACE
- WEIGHT
- RECIPE

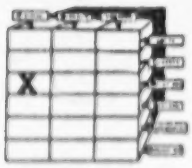
IV MESSAGE, THOUGHT, SHARE , PAPER
- LOVE
- LETTER
- LECTURE

V ROUGH, SOFT, SLICK, TOUCH
- MATERIAL
- FABRIC
- TEXTURE

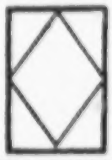
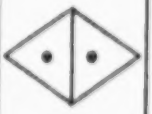
VI BALANCE, RHYTHM, POISE, BEAUTY
- MUSIC
- BALLET
- POETRY

CLASSIFY

FOR THESE WORDS: WORD CLASS	CHOOSE ONE
CAKE BREAD COOKIES PIES	BAKED GOODS PASTRY DESSERT
DIAMONDS PEARLS EARRINGS BRACELET	STOLEN GEMS PRECIOUS STONES JEWELRY
WAGON BIKE SCOOTER SKATES	FOUR WHEELS MAN PROPELLED CONVEYANCE VEHICLES
HEN DUCK TURKEY PHEASANT	FARM ANIMALS WILD GAME FOWL
KNIVES FORKS SOUP SPOON TEA SPOON	KINCHEN UTENSILS SILVERWARE HARDWARE
DOLLS JUMP ROPE TOP JACKET	CHRISTMAS PRESENTS TOYS GAMES
NORTH SOUTH EAST WEST	TOWN DIRECTION STREETS



DIRECTIONS: For each key figure (A–F), select one of the figures on the right that exhibits the described relation to the key figure.

KEY	Description	1	2	3	4	5
A	Oval changes to a diamond. Three dots are added to inside.					
B	Rectangle becomes square. Circle is placed inside.					
C	Two dots are removed and a line is added to inside.					
D	Hexagon changes to an oval and two more wedges are formed.					
E	Oval added to the inside and a line is drawn down the middle.					
F	Changes to an octagon with the two dots becoming squares.					

Test Flight Information Sheet

NAME _____ **PLANE** _____

DIRECTIONS: Test one plane ten times in each of the three categories.

Duration:

Launch your plane. Use a stop watch and determine how many seconds it remains in flight. Record your findings.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Average _____

Acrobatics:

Launch your plane and evaluate its performance as excellent, good, or poor. Repeat nine times and record each evaluation. Then make a final judgement.

1. excellent _____ good _____ poor
2. excellent _____ good _____ poor
3. excellent _____ good _____ poor
4. excellent _____ good _____ poor
5. excellent _____ good _____ poor
6. excellent _____ good _____ poor
7. excellent _____ good _____ poor
8. excellent _____ good _____ poor
9. excellent _____ good _____ poor
10. excellent _____ good _____ poor

Overall performance _____

Altitude:

Launch your plane and decide if it is a climber. Evaluate its performance as excellent, average, or nonclinber. Repeat nine times and record each evaluation. Arrive at a final judgement as to the planes ability at climbing.

1. excellent _____ good _____ non climber
2. excellent _____ good _____ non climber
3. excellent _____ good _____ non climber
4. excellent _____ good _____ non climber
5. excellent _____ good _____ non climber
6. excellent _____ good _____ non climber
6. excellent _____ good _____ non climber
7. excellent _____ good _____ non climber
8. excellent _____ good _____ non climber
9. excellent _____ good _____ non climber
10. excellent _____ good _____ non climber

Overall performance _____

In which event would this plane perform best? Why?

_____

_____

In which event would this plane perform the worst? Why?

_____

_____

Instructions for Constructing Glider

Figure 1. Fold corners to meet center line.

Figure 2. Fold center line and then unfold so pattern is flat again.

Figure 3. Fold two outside dotted lines as shown and glue together as shown. Add paper clip.

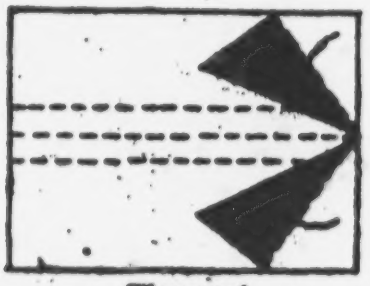


Figure 1.

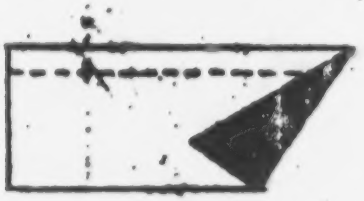


Figure 2

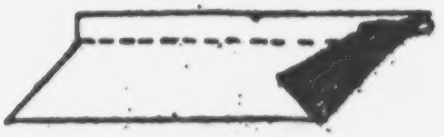


Figure 3.

Instructions for Constructing Flying Eagle

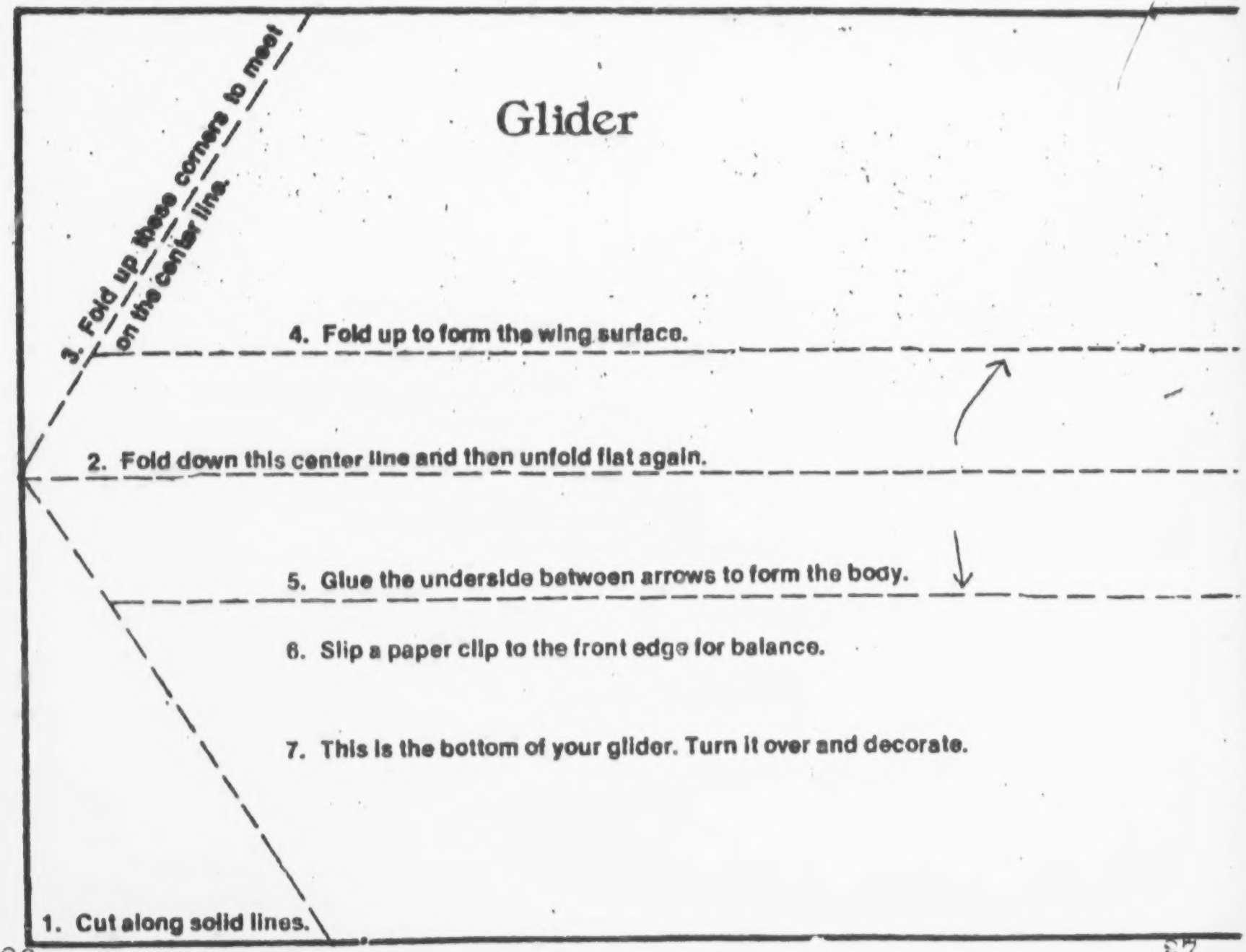
Figure 1. Fold center line as shown.

Figure 2. Fold down wings and tail as shown. Add paper clip.

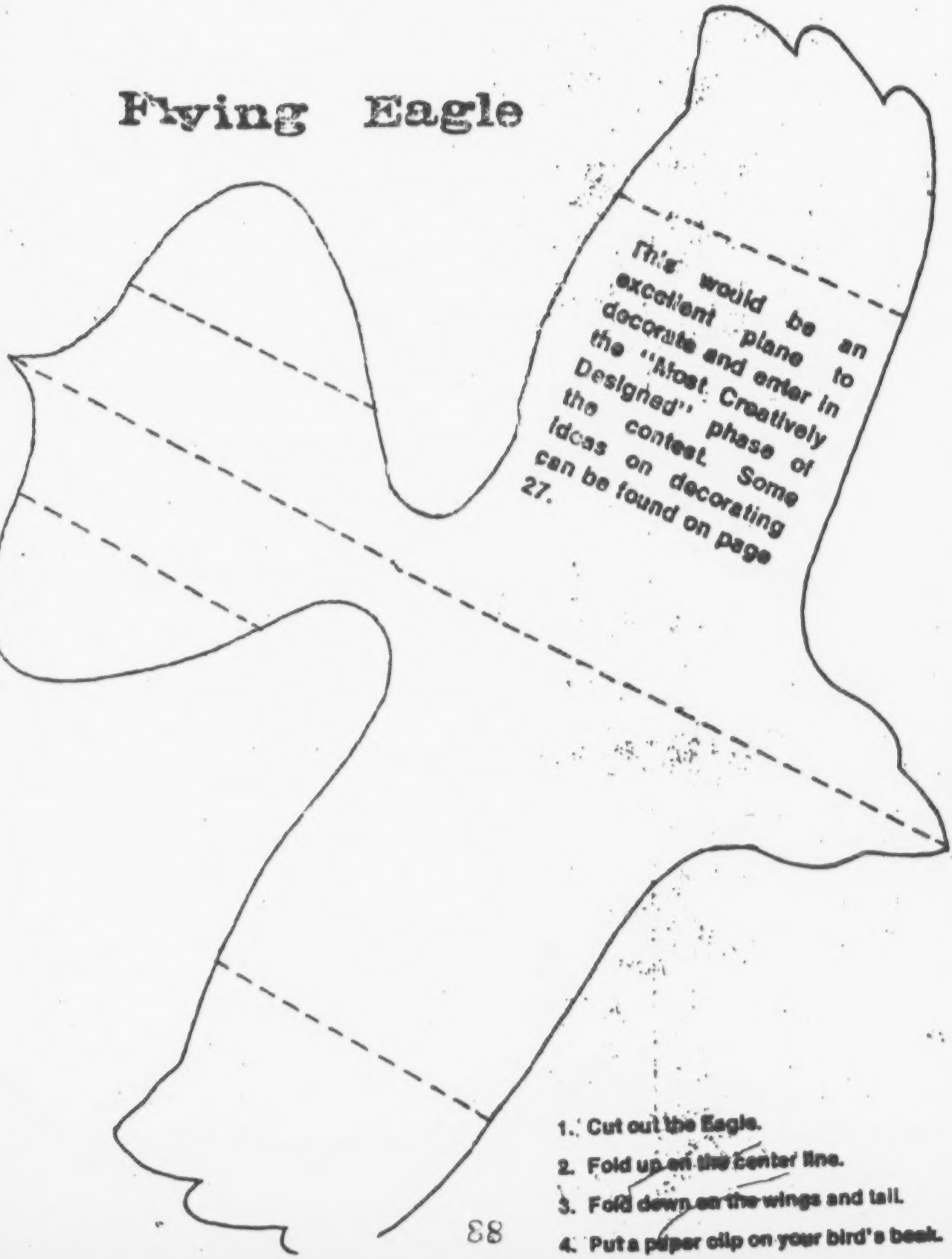
Figure 1

Figure 2

Glider


3. Fold up these corners to meet on the center line.
4. Fold up to form the wing surface.
2. Fold down this center line and then unfold flat again.
5. Glue the underside between arrows to form the body.
6. Slip a paper clip to the front edge for balance.
7. This is the bottom of your glider. Turn it over and decorate.
1. Cut along solid lines.

Flying Eagle



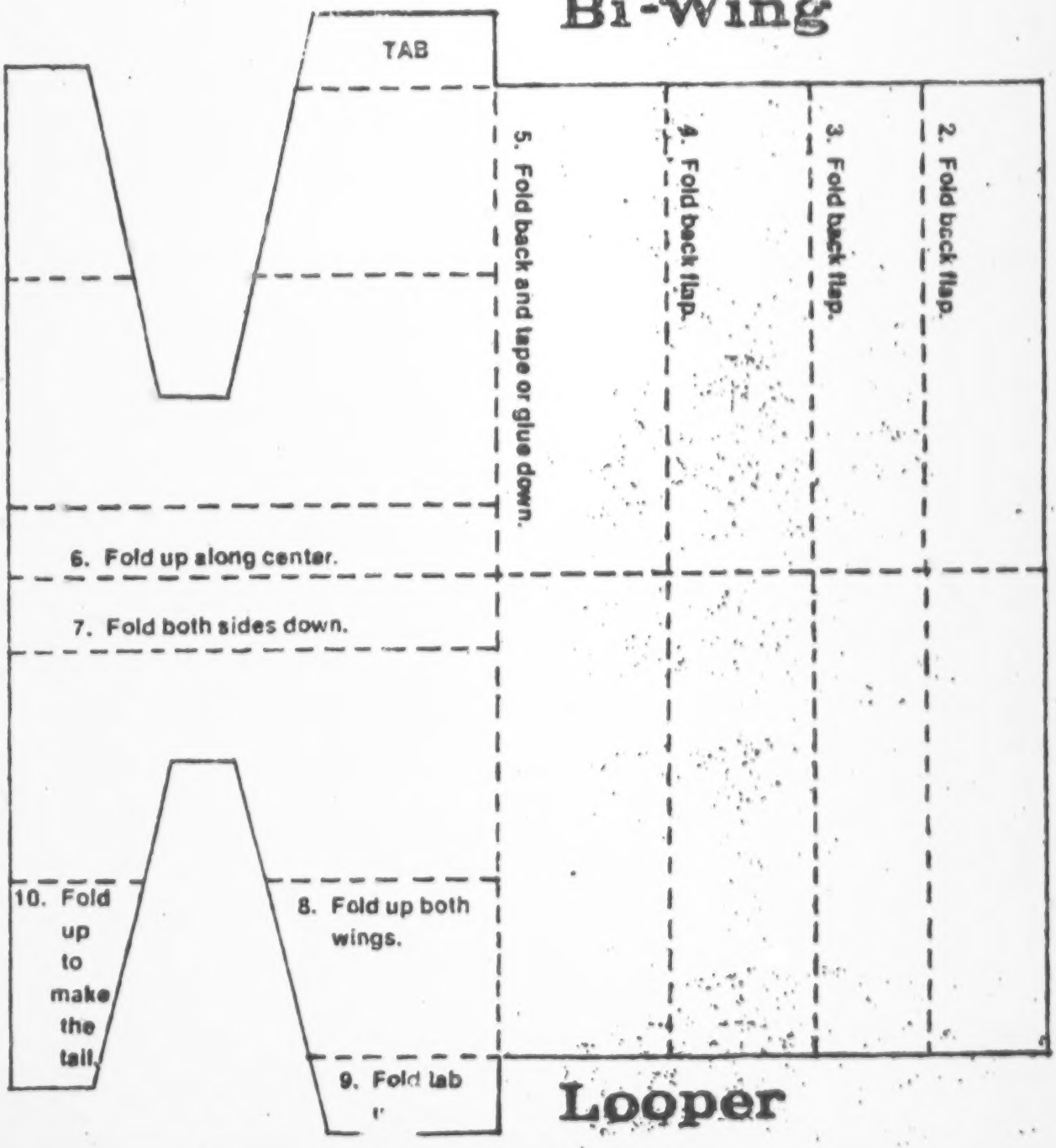
This would be an excellent plane to decorate and enter in the "Most Creatively Designed" phase of the contest. Some ideas on decorating can be found on page 27.

1. Cut out the Eagle.
2. Fold up on the center line.
3. Fold down on the wings and tail.
4. Put a paper clip on your bird's beak.

1. Cut along solid lines to make plane and top wing.

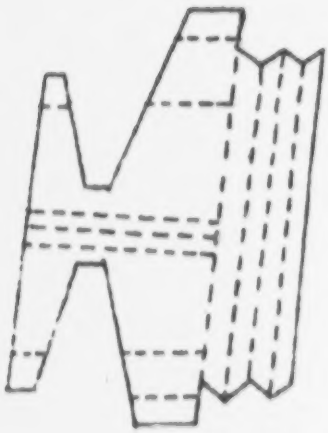
12. Fold down the center to make the top wing. Glue or tape to the wing flap.

Bi-Wing

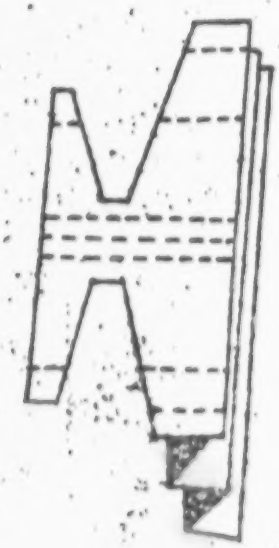

TAB
5. Fold back and tape or glue down.
4. Fold back flap.
3. Fold back flap.
2. Fold back flap.
6. Fold up along center.
7. Fold both sides down.
10. Fold up to make the tail.
8. Fold up both wings.
9. Fold tab

Looper

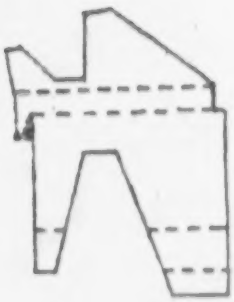
Instructions for Constructing Bi-Wing Looper



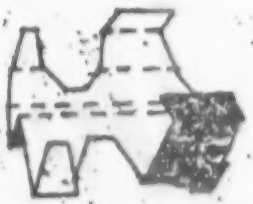
Step 1



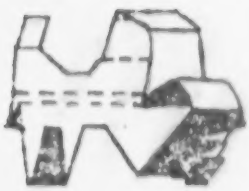
Step 2



Step 3



Step 4



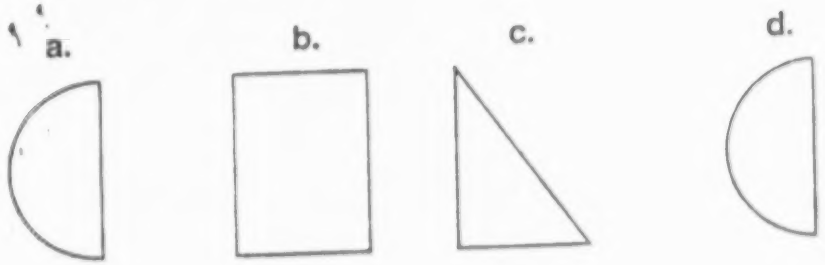
Step 5

Step 6

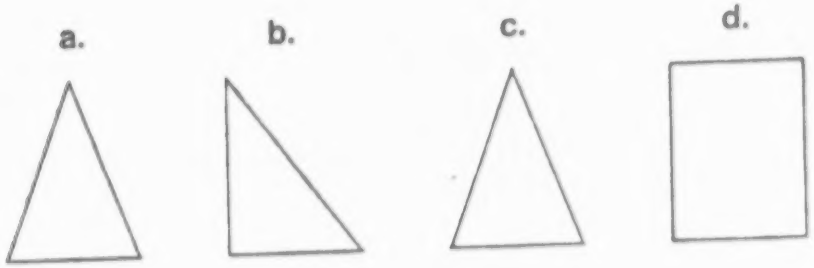
MATCHING SHAPES

Circle the shapes that are the same in each row.

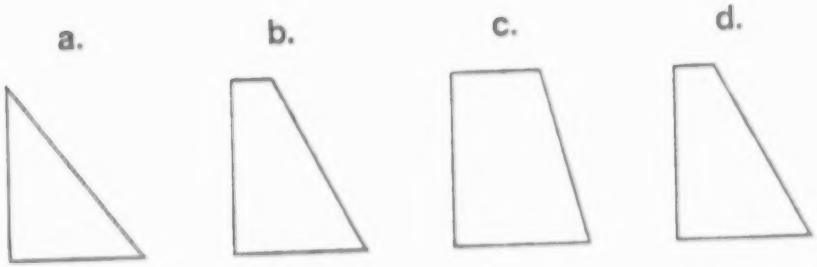
A-21



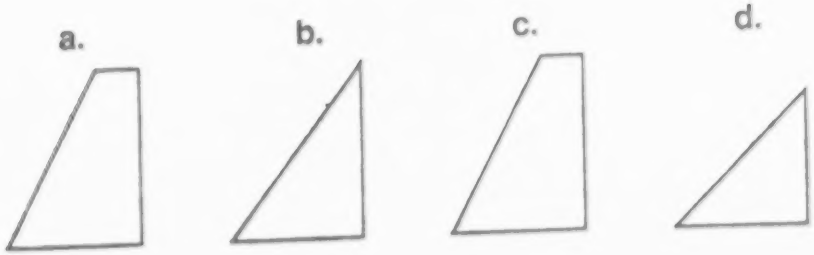
A-22



A-23



A-24



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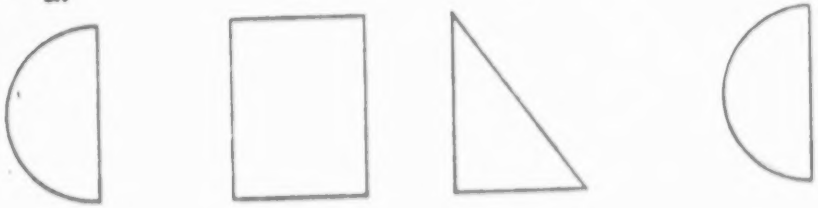
MATCHING SHAPES

Circle the shapes that are the same in each row.

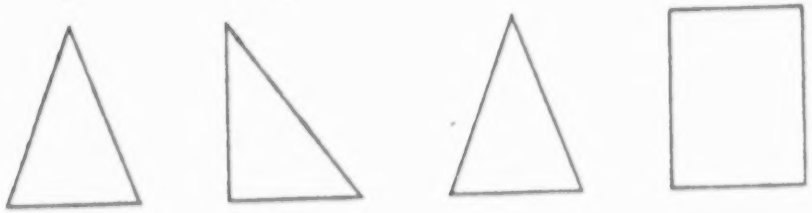
A-21

a. b. c. d.



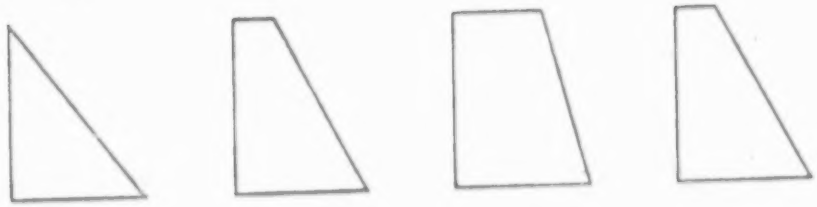
A-22

a. b. c. d.



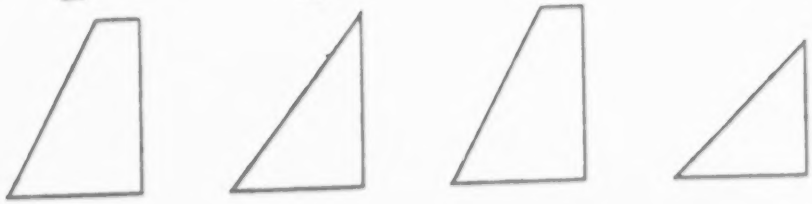
A-23

a. b. c. d.



A-24

a. b. c. d.



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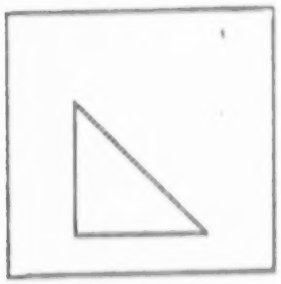
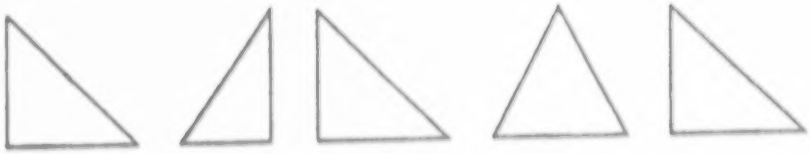
WHICH SHAPE DOES NOT MATCH?

Cross out the shapes that are **different** from the one in the box.

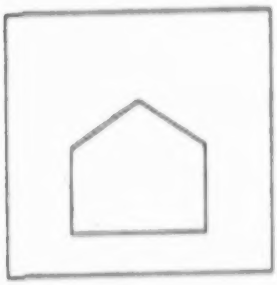
A-35



a. b. c. d. e.

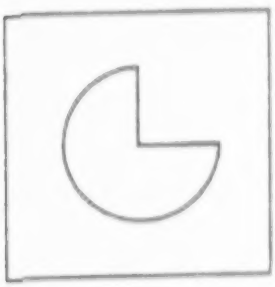


A-36



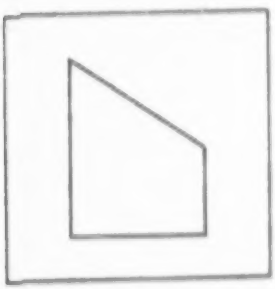
a. b. c. d. e.

A-37

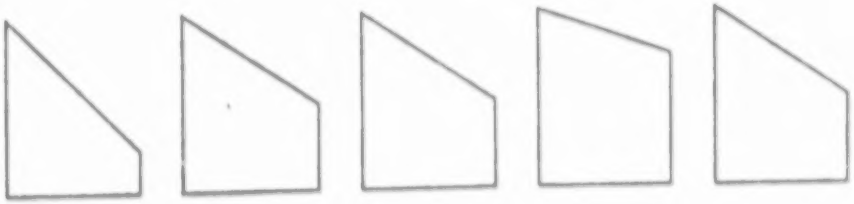


a. b. c. d.

A-38



a. b. c. d. e.



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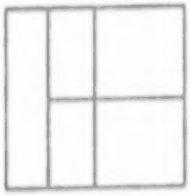
FINDING AND TRACING PATTERNS

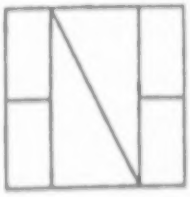
Circle any figure that contains the letter on the left. Remember, there may be extra lines. The letter must be the same size as the one on the left. Trace over the letter to make sure you are right.

A-59

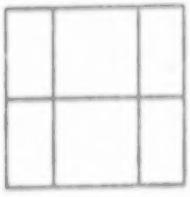
a.



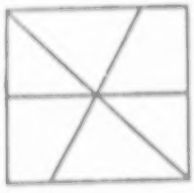
b.



c.

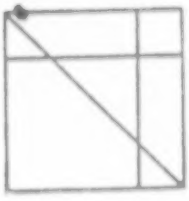


d.

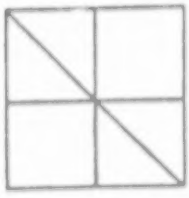


A-60

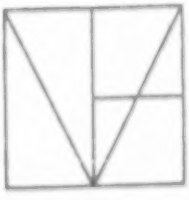
a.



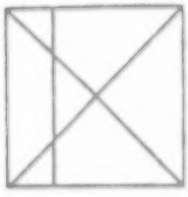
b.



c.



d.



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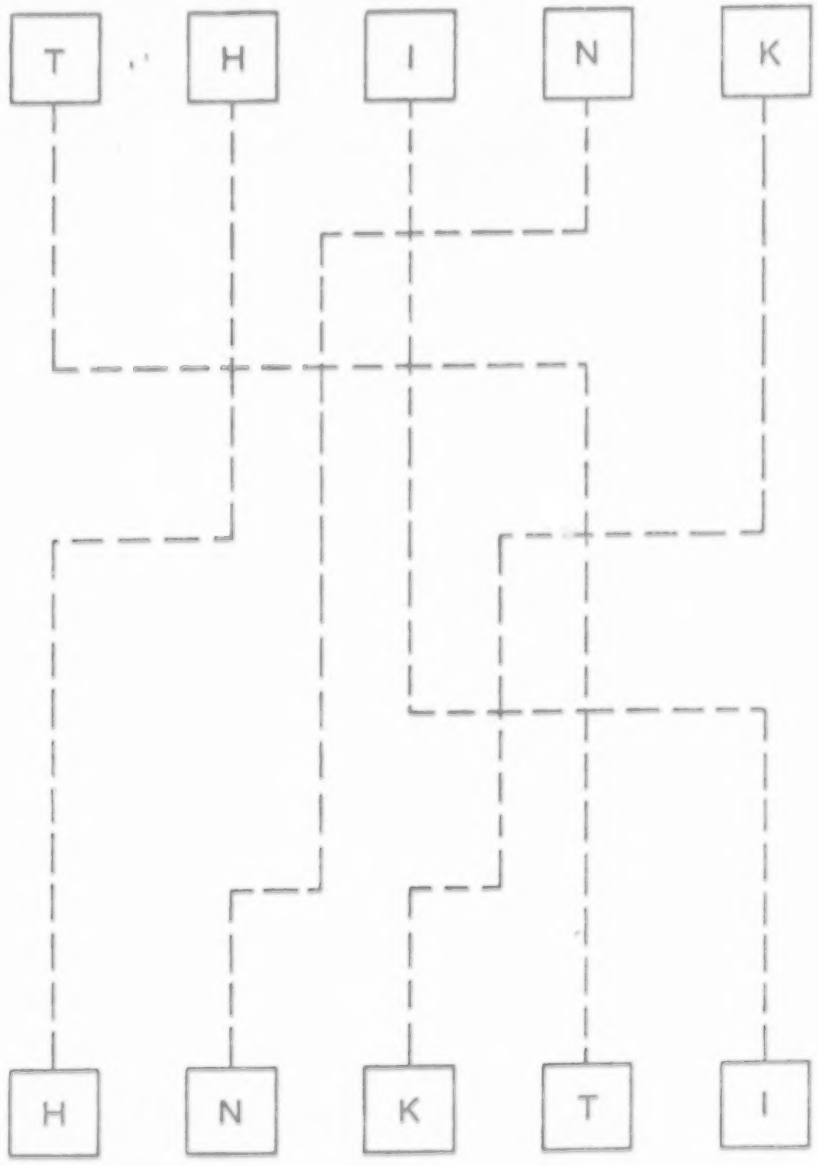
TRACKING

B-3 Color the matching letters and the path between them the same color. Choose a different color for each letter. No section of the path can have two colors.



SEQUENCE OF FIGURES-SUPPLY

Complete the pattern. Draw in the correct shape on the line.

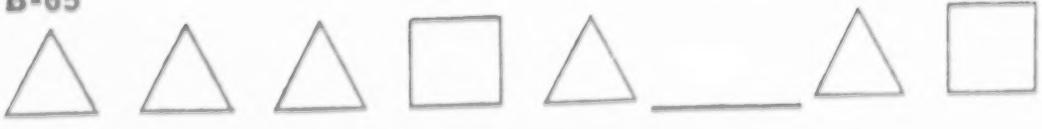
B-61

B-62

B-63

B-64

B-65



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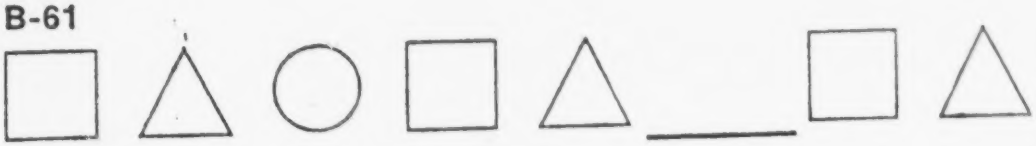
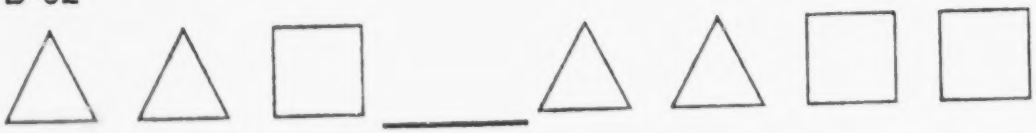
SEQUENCE OF FIGURES-SUPPLY

Complete the pattern. Draw in the correct shape on the line.

B-61

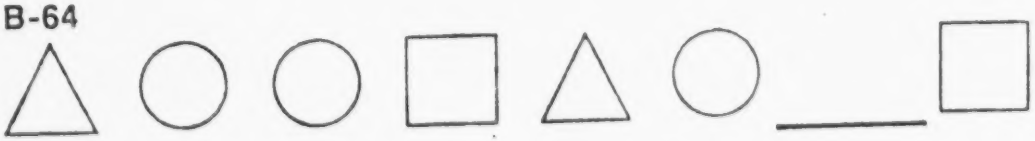


B-62

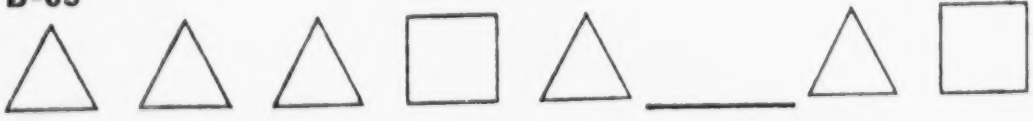


B-63

B-64



B-65



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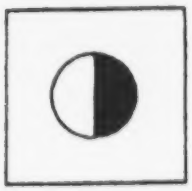
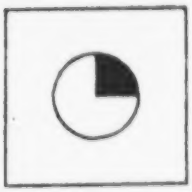
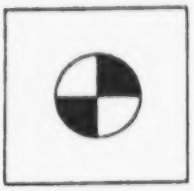
CLASSIFYING BY PATTERN

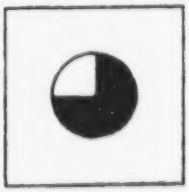
Sometimes figures are grouped by the patterns on the shapes. Match each shape with its group by drawing lines from each shape to the group (class) that has the same pattern.

SHAPES

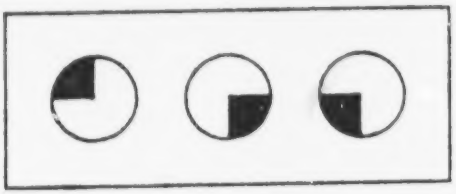
C-13 

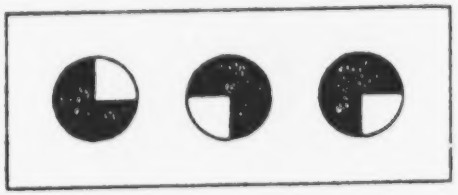
C-14 

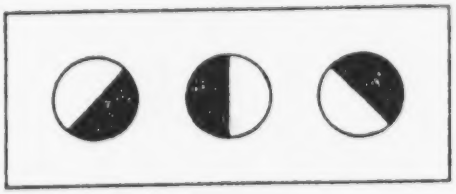
C-15 

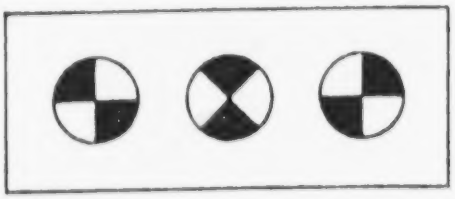
C-16 

GROUPS

a. 

b. 

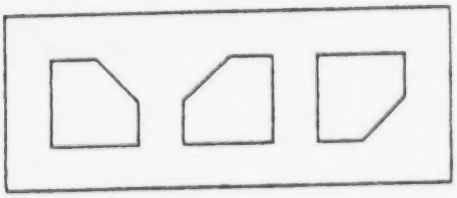
c. 

d. 

CLASSIFYING BY SHAPE

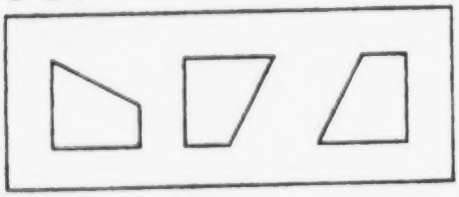
Circle the shape that belongs to the group in the box.

C-28

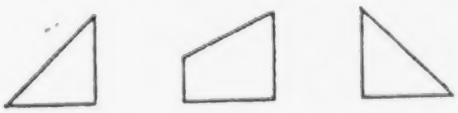


a. b. c.

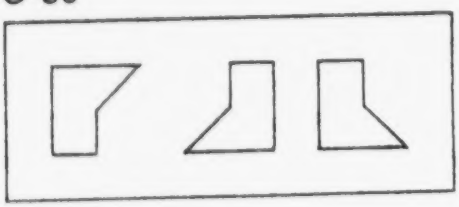
C-29



a. b. c.

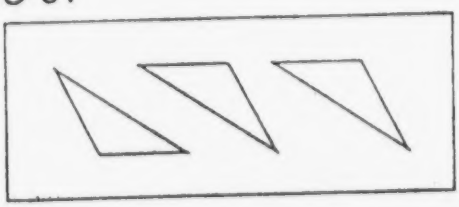


C-30



a. b. c.

C-31



a. b. c.

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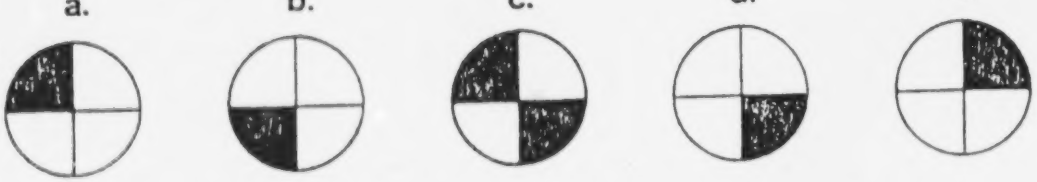
CLASSIFYING BY PATTERN—FIND THE EXCEPTION

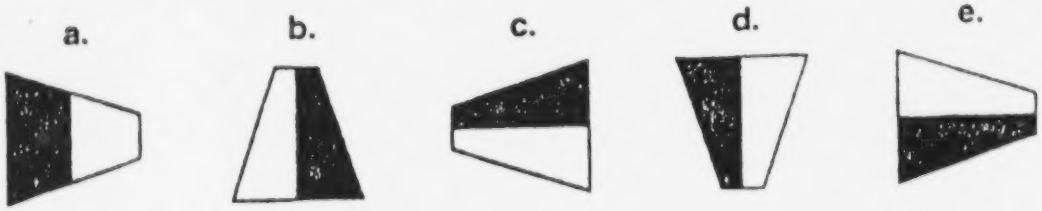
Cross out the figure that has a pattern that does not belong to the class.

C-78

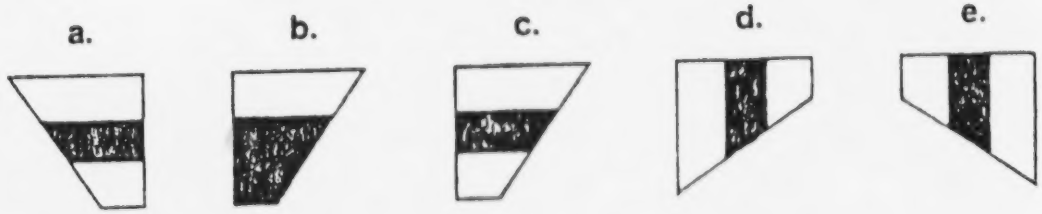
C-79



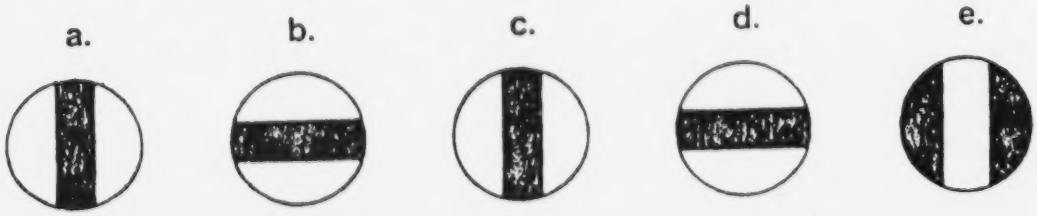
C-80



C-81



C-82



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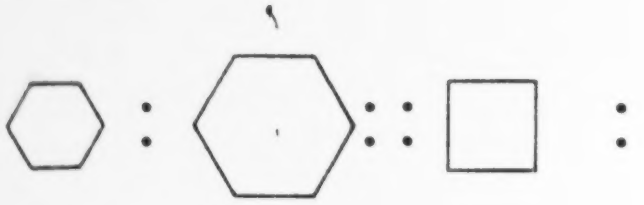
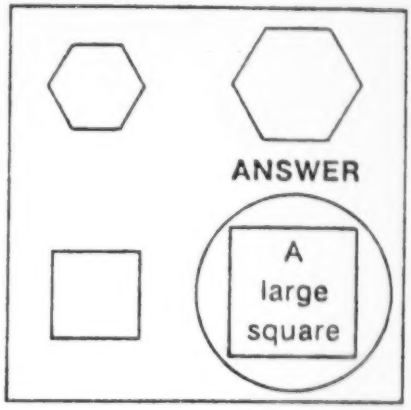
FIGURAL ANALOGIES—SELECT

Circle the figure that completes the FIGURAL ANALOGY.

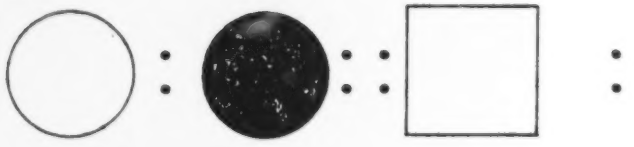
EXAMPLE:

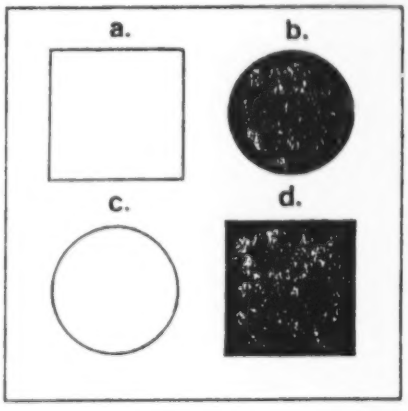


A small hexagon is to a large hexagon as a small square is to

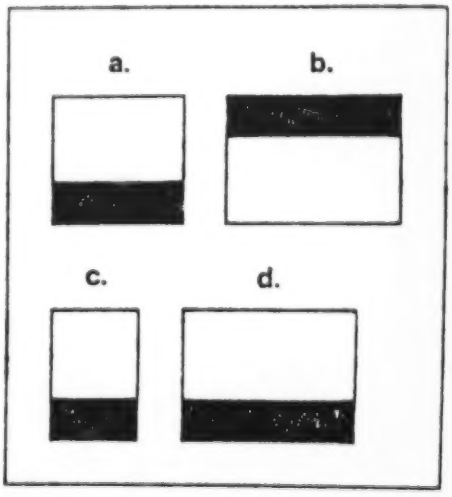


D-1





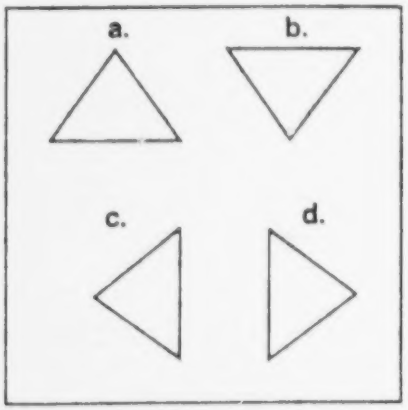
D-2



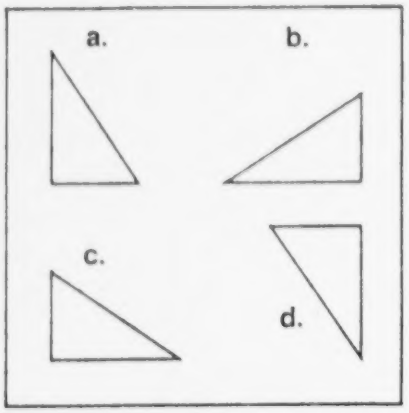
FIGURAL ANALOGIES—SELECT

Circle the figure that completes the FIGURAL ANALOGY.

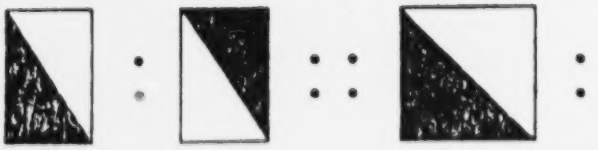
D-10

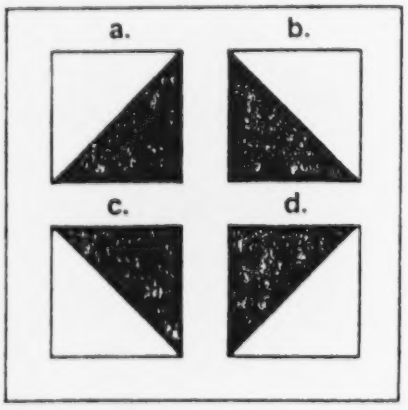


D-11



D-12





OPPOSITES—SELECT

Each line contains four words. Read the first word and think about what it means. One of the next three words will mean the **opposite** of the first word. Underline the word that is the opposite of the first word.

E-16	big	**a.** large **b.** little **c.** tall
E-17	dry	**a.** bright **b.** hot **c.** wet
E-18	die	**a.** live **b.** old **c.** sick
E-19	clean	**a.** dirty **b.** new **c.** old
E-20	clear	**a.** bright **b.** cloudy **c.** sunny
E-21	several	**a.** few **b.** many **c.** some
E-22	lost	**a.** found **b.** gone **c.** look
E-23	catch	**a.** ball **b.** play **c.** throw

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OPPOSITES—SELECT

Each line contains four words. Read the first word and think about what it means. One of the next three words will mean the **opposite** of the first word. Underline the word that is the opposite of the first word.

E-32 right **a.** correct **b.** hard **c.** wrong

E-33 back **a.** bone **b.** end **c.** front

E-34 head **a.** first **b.** foot **c.** strong

E-35 hard **a.** difficult **b.** easy **c.** problem

E-36 hard **a.** firm **b.** rock **c.** soft

E-37 dull **a.** boring **b.** exciting **c.** long

E-38 often **a.** again **b.** repeat **c.** seldom

E-39 shout **a.** cry **b.** yell **c.** whisper

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OPPOSITES — SUPPLY

Each line contains a word. Read the word and think about what it means. Think of a word that means the **opposite** of that word. Write the word that you think of. (If you can think of other opposites, write them all down.)

E-48 true

E-49 whisper

E-50 start

E-51 lost

E-52 after

E-53 never

E-54 none

E-55 many

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FOLLOWING DIRECTIONS

F-27

Cross out the letters
A, Z, J, and P

P G A O Z J Z O D P

Z W A P J O R A Z J K P

Write the two words you see

_____ _____

F-28

Cross out the letters
B, L, M, and Q

Q E B N M O L U M G B H L
B O Q F L
B T Q H L M I Q S M

Write the three words you see

_____ _____ _____

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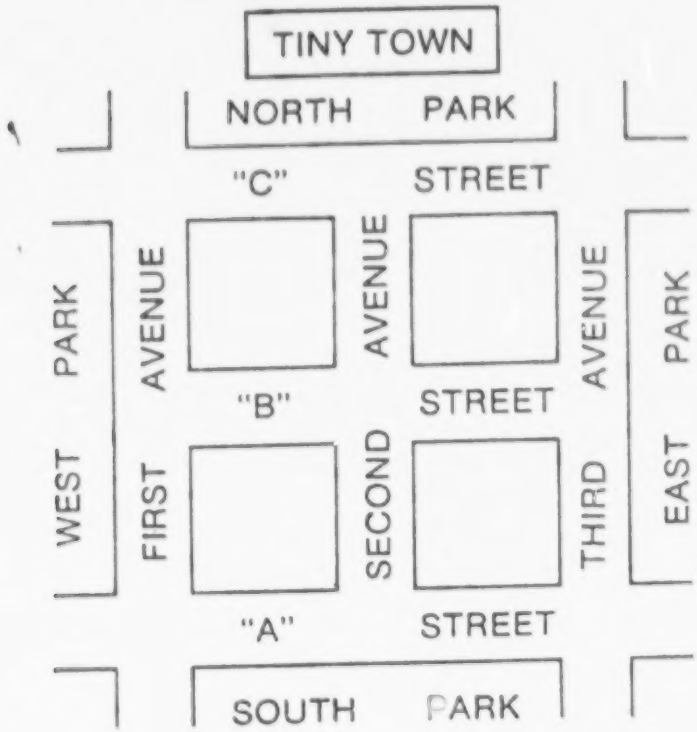
FINDING LOCATIONS WITH MAPS



F-65 Mark and "X" where First Avenue and "A" Street cross.

F-66 Mark a "Y" where Third Avenue and "A" Street cross.

F-67 Mark a "Z" where Third Avenue and "C" Street cross.

F-68 How far is it from First Avenue to Third Avenue?
Answer: _____ blocks

F-69 How far is it from "A" Street to "C" Street?
Answer: _____

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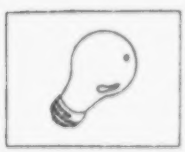
PARTS OF A WHOLE—SELECT

On each line are four words. Read the words and decide which word represents a whole thing and which of the words are parts of the whole thing. On the lines below each group, first write the word which represents the whole thing, and then list the words that are parts of the whole thing.

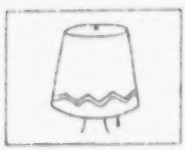
G-6



bulb

cord

lamp



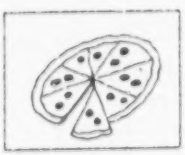
shade

WHOLE _____ PARTS _____, _____, _____

G-7

cheese

crust



pizza

tomato

WHOLE _____ PARTS _____, _____, _____

G-8

bull

calf

cow

herd

WHOLE _____ PARTS _____, _____, _____

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PARTS OF A WHOLE—SELECT

On each line are four words. Read the words and decide which word represents a whole thing and which of the words are parts of the whole thing. On the lines below each group, first write the word which represents the whole thing, and then list the words that are parts of the whole thing.

G-9

bun

hamburger

meat patty

tomato

WHOLE _____ PARTS _____, _____, _____

G-10

band

drummer

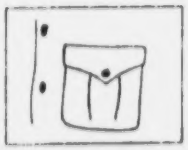
trumpeter

tuba player

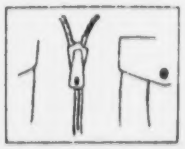
WHOLE _____ PARTS _____, _____, _____

G-11

jacket


pocket

sleeve


zipper

WHOLE _____ PARTS _____, _____, _____

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ANALOGIES—SUPPLY

Look at the first two words. Think about how they are related. Next, look at the third word and decide what word should belong in the blank. You must supply the fourth word from your vocabulary.* In this exercise, all the words have to do with houses.

H-79 above : below :: ceiling : _____

H-80 outside : inside :: porch : _____

H-81 door : wood :: window : _____

H-82 above : ceiling :: side : _____

H-83 shingles : roof :: rug : _____

H-84 chimney : roof :: window : _____

*vocabulary—words that you remember

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ANALOGIES—SUPPLY

Look at the first two words. Think about how they are related. Next, look at the third word and pick a word from your memory that belongs in the blank.

H-91 tan : brown :: pink : _____

H-92 arrow : bow :: bullet : _____

H-93 over : above :: under : _____

H-94 front : first :: rear : _____

H-95 sky : air :: lake : _____

H-96 knife : slice :: scissors : _____

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ANALOGIES—SELECT THE RIGHT PAIR

Look at the first two words. Think about how they are related. In the **CHOICE COLUMN,** find a pair of words that are related in the same way.

H-113 up : down :: _____ : _____

CHOICE COLUMN

below : under
beneath : under
over : under
over : upper

H-114 more : less :: _____ : _____

always : often
much : more
now : then
plus : minus

H-115 mother : child :: _____ : _____

brother : sister
girl : boy
parent : baby
son : mother

H-116 slow : fast :: _____ : _____

always : often
minus : less
much : more
seldom : often

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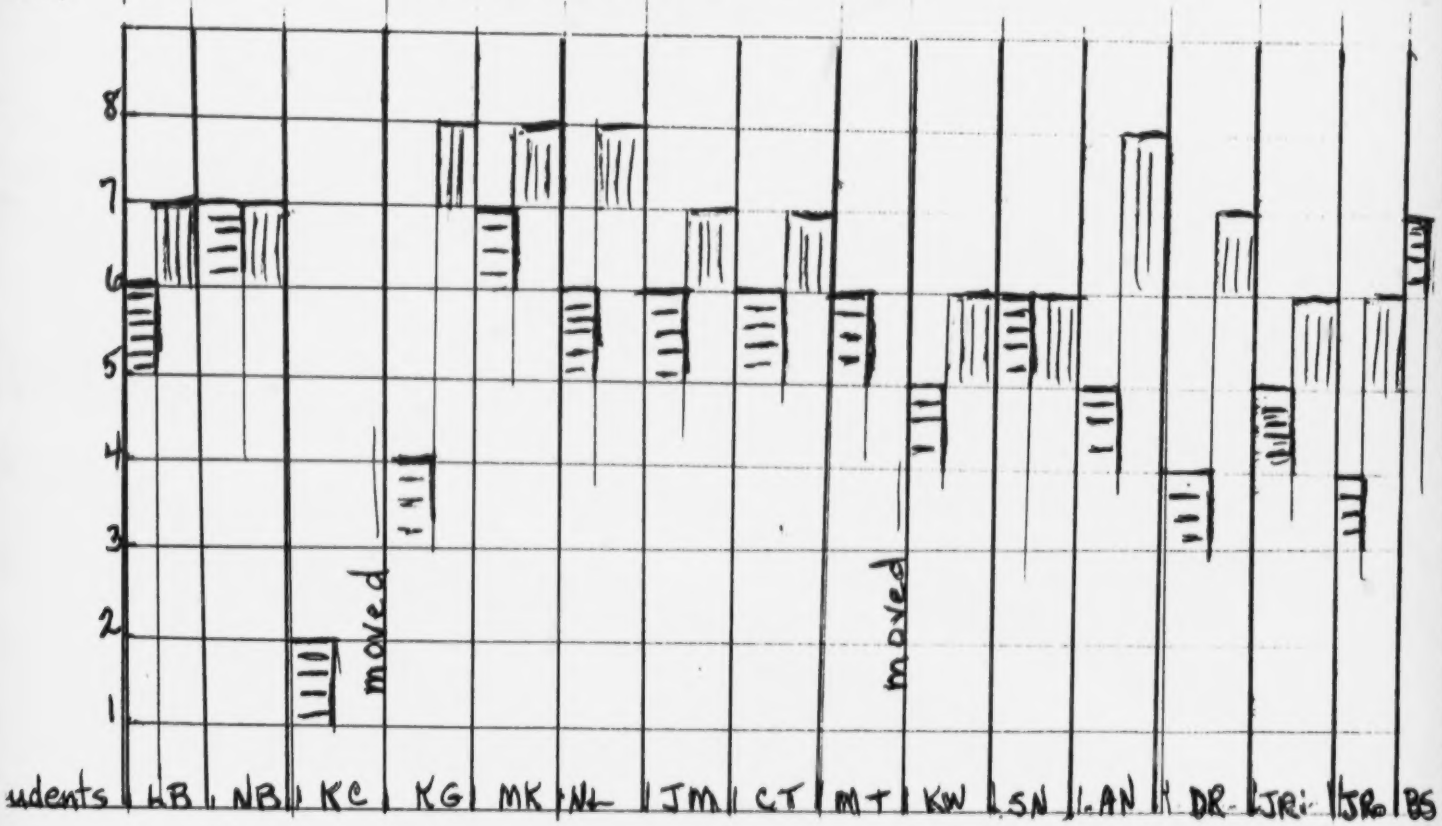
Appendix N

RE =
DST

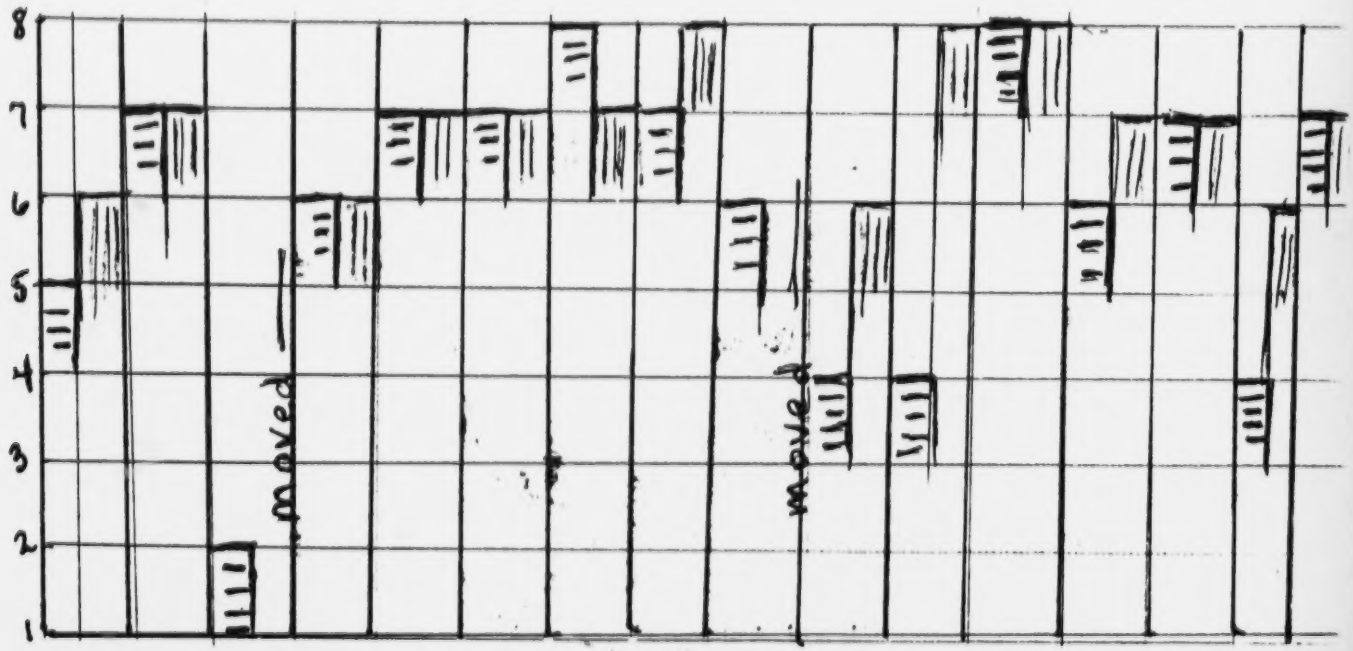
CRITICAL THINKING SKILLS CHART

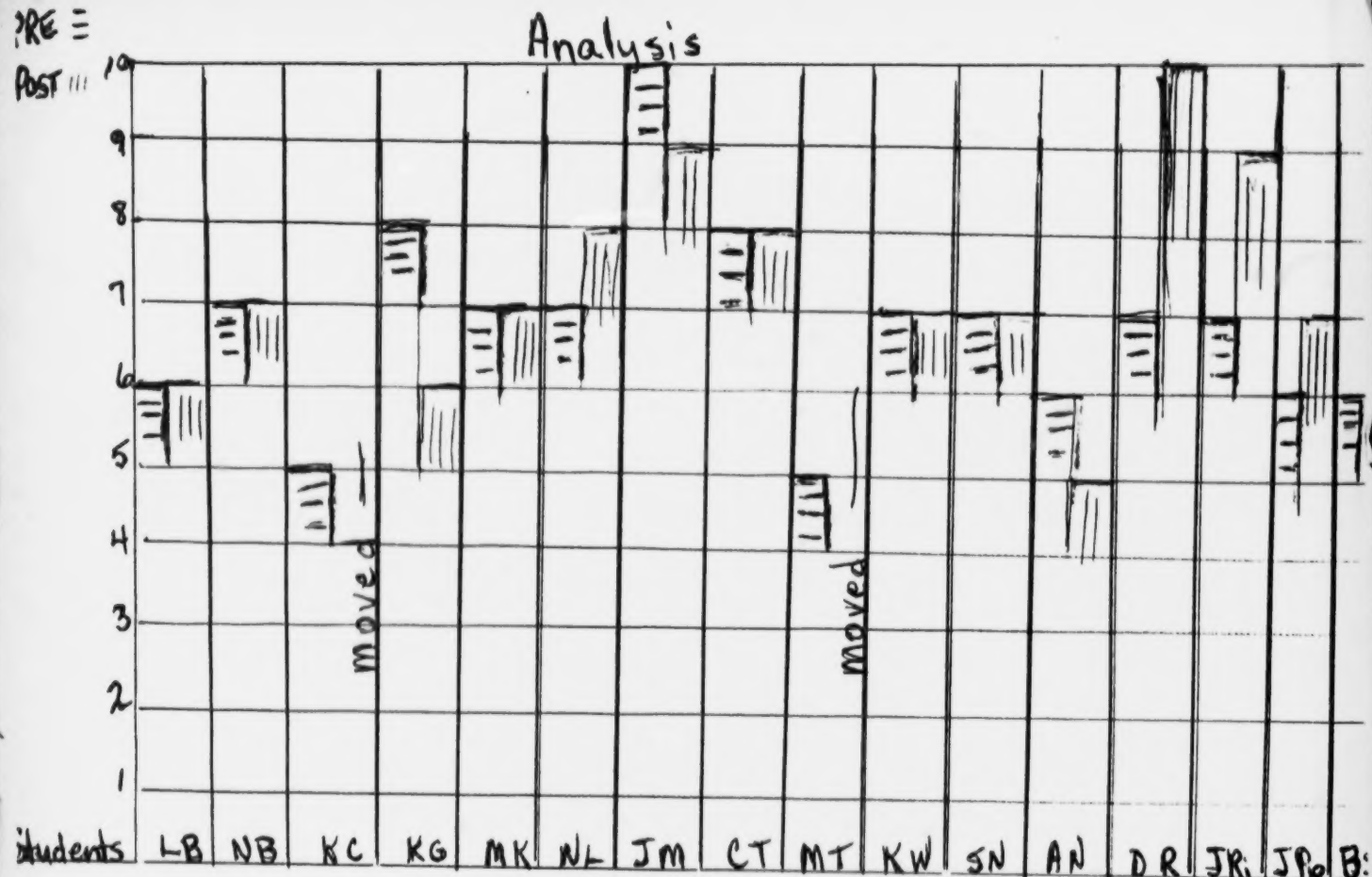
COMPREHENSION

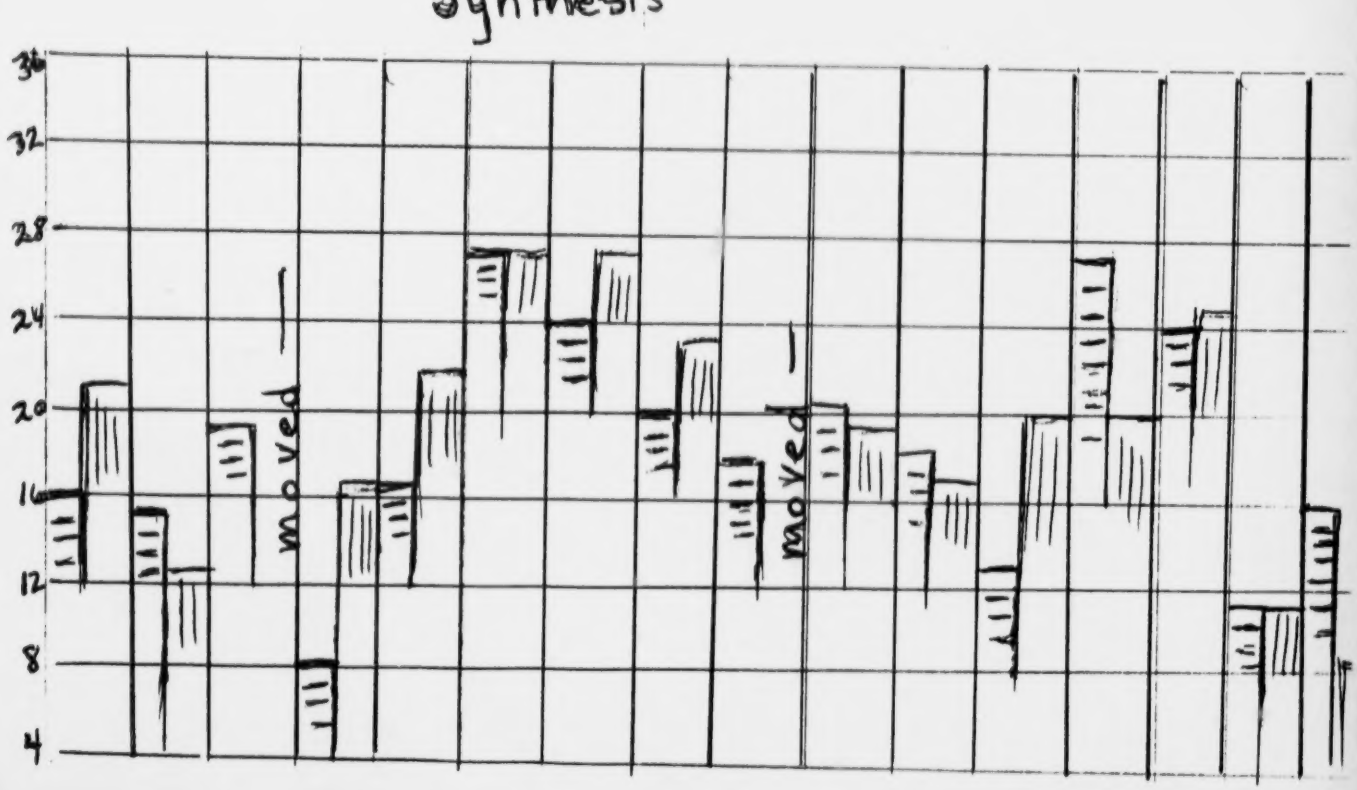


RE =
DST

APPLICATION




PRE
POST
Analysis
10
9
8
7
6
5
4
3
2
1
moved
moved
students
LB
NB
KC
KG
MK
NL
JM
CT
MT
KW
SN
AN
DR
JR
JP
B:


Synthesis
36
32
28
24
20
16
12
8
4
moved
moved